

بسم الله الرحمن الرحيم هذه الملزمة هي عبارة عن ملخصات من كتاب CBAILEY AND L oves) أضعها وبكل محبة بين ايديكم اخوتي وأخواتي متمنياً لكم دوام الصحة والعافية . انور قيس 2013/4/22

PART 1: Principles

1.The metabolic response to injury:

Summary box 1.1

Basic concepts

- Homeostasis is the foundation of normal physiology
- 'Stress-free' perioperative care helps to restore homeostasis following elective surgery
- Resuscitation, surgical intervention and critical care can

return the severely injured patient to a situation in which homeostasis becomes possible once again

Summary box 1.2

Neuroendocrine response to injury/critical illness

The neuroendocrine response to severe injury/critical illness is biphasic:

Acute phase characterised by an actively secreting pituitary and elevated counter-regulatory hormones

(cortisol,glucagon,adrenaline). Changes are thought to be beneficial for short-term survival

• Chronic phase associated with hypothalamic suppression and low serum levels of the respective target organ

hormones. Changes contribute to chronic wasting

Summary box 1.3

Systemic inflammatory response syndrome (SIRS) following major injury

■ Is driven initially by pro-inflammatory cytokines (e.g.IL-1, IL-6 and TNFα)

■ Is followed rapidly by increased plasma levels of cytokine

antagonists and soluble receptors (e.g.IL-1Ra,TNF-sR)

■ If prolonged or excessive may evolve into a counter- inflammatory response syndrome (CARS)

Summary box 1.4

Physiological response to injury The natural response to injury includes:

- Immobility/rest
- Anorexia

Catabolism

The changes are designed to aid survival of moderate injury in the absence of medical intervention.

Summary box 1.5

Purpose of neuroendocrine changes following injury

The constellation of neuroendocrine changes following injury acts to:

- Provide essential substrates for survival
- Postpone anabolism

• Optimise host defence These changes may be helpful in the short term, but may be

harmful in the long term, especially to the severely injured

patient who would otherwise not have survived without medical intervention.

INJURY

Phases of the physiological response to injury

EBB PHASE

HOURS

Shock

FLOW PHASE

DAYS

Catabolism

RECOVERY

WEEKS

Anabolism

Summary box 1.6

Hypermetabolism

Hypermetabolism following injury:

■ Is mainly caused by an acceleration of futile metabolic cycles

■ Is limited in modern practice on account of elements of routine critical care

Summary box 1.7

Skeletal muscle wasting

- Provides amino acids for protein synthesis in central organs/tissues
- Is mediated at a molecular level mainly by activation of the ubiquitin–proteasome pathway
- Can result in immobility and contribute to hypostatic pneumonia and death if prolonged and excessive

Summary box 1.8

Hepatic acute phase response

The hepatic acute phase response represents a reprioritisation

of body protein metabolism towards the liver and is characterised by:

- Positive reactants (e.g.CRP):plasma concentration
- Negative reactants (e.g.albumin):plasma concentration

Summary box 1.9

Changes in body composition following major surgery/critical illness

- Catabolism leads to a decrease in fat mass and skeletal muscle mass
- Body weight may paradoxically increase because of expansion of extracellular fluid space

Summary box 1.10

Avoidable factors that compound the response to injury

- Continuing haemorrhage
- Hypothermia
- Tissue oedema
- Tissue underperfusion
- Starvation
- Immobility

A proactive approach to prevent unnecessary aspects of the surgical stress response

- Minimal access techniques
- Blockade of afferent painful stimuli (e.g.epidural analgesia)
- Minimal periods of starvation
- Early mobilization

2.Shock and blood transfusion

Summary box 2.1

Classification of shock

- Hypovolaemic
- Cardiogenic
- Obstructive
- Distributive
- Endocrine

	Hypovolaemia	Cardiogenic	Obstructive	Distributive
Cardiac output	Low	Low	Low	High
Vascular resistance	High	High	High	Low
Venous pressure	Low	High	High	Low
Mixed venous saturation	Low	Low	Low	High
Base deficit	High	High	High	High

Table 2.2 Clinical features of shock

	Compensated	Mild	Moderate	Severe
Lactic acidosis	+	++	++	+++
Urine output	Normal	Normal	Reduced	Anuric
Level of consciousness	Normal	Mild anxiety	Drowsy	Comatose
Respiratory rate	Normal	Increased	Increased	Laboured
Pulse rate	Mild increase	Increased	Increased	Increased
Blood pressure	Normal	Normal	Mild hypotension	Severe hypotension

0							
	Table 2.3 Effects of o	rgan failur	e				
	Lung	Acute re	espiratory dist	ress syndrome			_
	Kidney	Acute re	enal insufficie	ncy			
_	Liver	Acute li	ver insufficie	ncy			-
_	Clotting	Coagulo	opathy				-
_	Cardiac	Cardiov	vascular failur	e			-
_	Summary box 2.2						-
	Monitoring for patien	ts in shock					_
_	Minimum						-
	■ Electrocardiogram						-
	■ Pulse oximetry						-
_	Blood pressure						-
	■ Urine output						-
_	Additional modalities						-
	■ Central venous pres	sure					-
_	Invasive blood pres	sure					-
	■ Cardiac output						-
_	■ Base deficit and ser	um lactate					-
							-
_	Table 2.5 Traditional	classificati	on of haemor	rhagic shock			-
	Class	1	2	3		4	-
	Blood volume lost as	<15%	15-30%	30–40%	>40%	percentage of total	-
_	Summary box 2.3						-
	Damage control surge	ery					-
_	■ Arrest haemorrhage						-
シー							

Control sepsis		
■ Protect from further in	njury	
 Nothing else 		
Table 2.7 Perioperative	red blood cell transfusion criteria	
Haemoglobin	Indication	
lavel (gdl 1)	mulcation	
level (gui-1)	Drobably will benefit from transfusion	
<0		
0-8	I ransfusion unlikely to be of benefit in the	
	absence of bleeding or impending surgery	
>8	No indication for transfusion	
Complications of bl	ood transfusion	
Complications from a	single transfusion include:	
1- incompatibility haem	olytic transfusion reaction;	
2- febrile transfusion rea	action;	
3-allergic reaction;		
4-infection:		
-bacterial infection (usu	ally as a result of faulty storage);	
-hepatitis;		
-HIV:		
-malaria		
5- air embolism		
6 thrombophlabitis:		
/- transfusion-related ac	cute lung injury (usually from FFP).	
Ľ		8

Complications from massive transfusion Complications from massive transfusion include: 1-coagulopathy; 2- hypocalcaemia; 3- hyperkalaemia; 4- hypokalaemia; 5- hypothermia. Additionally, patients who receive repeated transfusions over long periods of time (e.g. patients with thalassaemia) may developiron overload. (Each transfused unit of red blood cells

contains approximately 250mg of

3.Wounds, tissue repair and scars

Summary box 3.1

Factors influencing healing of a wound

- Site of the wound
- Structures involved
- Mechanism of wounding

Incision

Crush

Crush avulsion

- Contamination (foreign bodies/bacteria)
- Loss of tissue
- Other local factors

Vascular insufficiency (arterial or venous)

Previous radiation

Pressure

■ Systemic factors

Malnutrition or vitamin and mineral deficiencies

Disease (e.g.diabetes mellitus)

Medications (e.g.steroids)

Immune deficiencies [e.g.chemotherapy,acquired

immunodeficiency syndrome (AIDS)]

Smoking

a.In explosions, the contamination may consist of tissue such as bone from another individual.

Summary box 3.2

A classification of wound closure and healing

- By primary intention Wound edges opposed.Normal healing.Minimal scar
- By secondary intention

Wound left open. Heals by granulation, contraction and epithelialisation

Increased inflammation and proliferation, Poor scar

By tertiary intention (also called delayed primary intention)

Wound initially left open

Edges later opposed when healing conditions favourable

Summary box 3.3

Tidy vs. untidy wounds

Tidy	Untidy
Incised	Crushed or avulsed
Clean	Contaminated
Healthy tissues	Devitalised tissues
Seldom tissue loss	Often tissue loss

Managing the acute wound

- Cleansing
- Exploration and diagnosis
- Debridement
- Repair of structures
- Replacement of lost tissues where indicated
- Skin cover if required
- Skin closure without tension
- All of the above with careful tissue handling and meticulous technique

Summary box 3.5

Aetiology of leg ulcers

■ Venous disease leading to local venous hypertension (e.g. varicose veins)

- Arterial disease, either large vessel (atherosclerosis) or small vessel (diabetes)
- Arteritis associated with autoimmune disease (rheumatoid arthritis,lupus,etc.)
- Trauma could be self-inflicted
- Chronic infection tuberculosis/syphilis
- Neoplastic squamous or basal cell carcinoma, sarcoma

Summary box 3.6

Pressure sore frequency in descending order

- Ischium
- Greater trochanter
- Sacrum
- Heel
- Malleolus (lateral then medial)
- Occiput

Staging of pressure sores Stage 1Non-blanchable erythema without a breach in the epidermis Stage 2Partial-thickness skin loss involving the epidermis and dermis Stage 3Full-thickness skin loss extending into the subcutaneous tissue but not through underlying fascia Stage 4Full-thickness skin loss through fascia with extensive tissue destruction, maybe involving muscle, bone, tendon or joint

Summary box 3.8

Summary box 3.7

Sign of necrotising infections

- Oedema beyond area of erythema
- Crepitus
- Skin blistering
- Fever (often absent)
- Greyish drainage ('dishwater pus')
- Pink/orange skin staining
- Focal skin gangrene (late sign)
- Final shock, coagulopathy and multiorgan failure

Summary Box 3.9

Treatment of hypertrophic and keloid scars

- Pressure local moulds or elasticated garments
- Silicone gel sheeting (mechanism unknown)
- Intralesional steroid injection (triamcinolone)
- Excision and steroid injectiona

- Excision and postoperative radiation (external beam or brachytherapy)
- Intralesional excision (keloids only)
- Laser to reduce redness (which may resolve in any event)
- Vitamin E or palm oil massage (unproven)

a.All excisions have high rates of recurrence.

4.Surgical infection

summary box 4.1

Koch's postulates proving the agency of an infective organism It must be found in considerable numbers in the septic focus It should be possible to culture it in a pure form from that septic focus It should be able to produce similar lesions when injected into another host

Summary box 4.2

Advances in the control of infection in surgery

- Aseptic operating theatre techniques have replaced toxic antiseptic techniques
- Antibiotics have reduced postoperative infection rates after elective and emergency surgery
- Delayed primary,or secondary,closure remains useful in contaminated wounds

Summary box 4.3

Causes of reduced host resistance to infection

- Metabolic:malnutrition (including obesity),diabetes,uraemia,jaundice
- Disseminated disease:cancer and acquired immunodeficiency syndrome (AIDS)
- Iatrogenic:radiotherapy,chemotherapy,steroids

Risk factors for increased risk of wound infection

- Malnutrition (obesity,weight loss)
- Metabolic disease (diabetes, uraemia, jaundice)
- Immunosuppression (cancer, AIDS, steroids, chemotherapy

and radiotherapy)

- Colonisation and translocation in the gastrointestinal tract
- Poor perfusion (systemic shock or local ischaemia)
- Foreign body material
- Poor surgical technique (dead space,haematoma)

Gut failure, colonisation and translocation related to the development of multiple organ dysfunction syndrome (MODS) and systemic inflammatory response syndrome (SIRS). IL, interleukin; TNF, tumour necrosis factor.

Summary box 4.5

Factors that determine whether a wound will become infected

- Host response
- Virulence and inoculum of infective agent
- Vascularity and health of tissue being invaded (including local ischaemia as well as systemic shock)
- Presence of dead or foreign tissue
- Presence of antibiotics during the 'decisive period'

Classification of sources of infection

Primary:acquired from a community or endogenous

source (such as that following a perforated peptic ulcer)

■ Secondary or exogenous (HAI):acquired from the

operating theatre (such as inadequate air filtration) or the ward (e.g.poor hand-washing compliance) or from contamination at or after surgery (such as an anastomotic leak)

Summary box 4.7

Major wound infections

- Significant quantity of pus
- Delayed return home
- Patients are systemically ill

Summary box 4.8

Abscesses

- Abscesses need drainage with curettage
- Modern imaging techniques may allow guided aspiration
- Antibiotics are indicated if the abscess is not localised (e.g. evidence of cellulitis)
- Healing by secondary intention is encouraged

Summary box 4.9

Cellulitis and lymphangitis

- Non-suppurative, poorly localised
- Commonly caused by streptococci, staphylococci or clostridia
- SIRS is common
- Blood cultures are often negative

Definitions of infected states

- SSI is an infected wound or deep organ space
- SIRS is the body's systemic response to an infected wound
- MODS is the effect that the infection produces systemically
- MSOF is the end-stage of uncontrolled MODS

Summary box 4.11

Bacteraemia and sepsis

- Sepsis is common after anastomotic breakdown
- Bacteraemia is dangerous if the patient has a prosthesis
- Sepsis may be associated with MODS

Table 4.3 Definitions of systemic inflammatory response syndrome

(SIRS) and sepsis

SIRS

Two of:

hyperthermia (>38°C) or hypothermia (<36°C)

tachycardia (>90min-1, no β -blockers) or tachypnoea (>20min-1)

white cell count >12 × 109 l–1 or <4 × 109 l–1

Sepsis is SIRS with a documented infection

Severe sepsis or sepsis syndrome is sepsis with evidence of one or

more organ failures [respiratory (acute respiratory distress syndrome),

cardiovascular (septic shock follows compromise of cardiac function and fall in peripheral vascular resistance), renal (usually acute tubular necrosis),

hepatic, blood coagulation systems or central nervous system]

Gas gangrene

- Caused by Clostridium perfringens
- Gas and smell are characteristic
- Immunocompromised patients are most at risk
- Antibiotic prophylaxis is essential when performing amputations to remove dead tissue

Summary box 4.13

Surgical incisions through infected or contaminated tissues

- When possible, tissue or pus for culture should be taken before antibiotic cover is started
- The choice of antibiotics is empirical until sensitivities are available
- Wounds are best managed by delayed primary or secondary closure

Summary box 4.14

Choice of antibiotics for prophylaxis

- Empirical cover against expected pathogens with local hospital guidelines
- Single-shot intravenous administration at induction of anaesthesia
- Repeat only in prosthetic surgery,long operations or if there is excessive blood loss
- Continue as therapy if there is unexpected contamination
- Benzylpenicillin should be used if Clostridium gas gangrene infection is a possibility
- Patients with heart valve disease or a prosthesis should be protected from bacteraemia caused by dental work, urethral instrumentation or visceral surgery

Summary box 4.15

Avoiding surgical site infections

- Staff should always wash their hands between patients
- Length of patient stay should be kept to a minimum
- Preoperative shaving should be avoided if possible

 Antiseptic skin 	preparation should be standard	lised
■ Attention to the	atre technique and discipline	
■ Avoid hypother	mia perioperatively and ensure	2
supplemental oxy	genation in recovery	
Table 4.5 Suggested prophy	vlactic regimens for operations at risk	
Type of surgery	Organisms	encountered Prophylactic regimen suggested
Vascular vancomycin	Staphylococcus epidermidis (or MRCNS)	Three doses of flucloxacillin with or without gentamicin,
	Staphylococcus aureus (or MRSA)	or rifampicin if MRCNS/MRSA a risk
	Aerobic Gram-negative bacilli (AGNB)	
Orthopaedic	Staphylococcus epidermidis/aureus	One to three doses of a broad-spectrum cephalosporin (with
		anti-staphylococcal action) or gentamicin beads
Oesophagogastric	Enterobacteriaceae	One to three doses of a second-generation cephalosporin and
	Enterococci (including anaerobic/ metronid	azole in severe contamination
	viridans streptococci)	
Biliary Enterobacteriaceae	(mainly Escherichia coli)	One dose of a second-generation cephalosporin
	Enterococci (including Streptococcus faecal	is)
Small bowel	Enterobacteriaceae	One to three doses of a second-generation cephalosporin with or
	Anaerobes (mainly Bacteroides)	without metronidazole
Appendix/colorectal	Enterobacteriaceae	Three doses of a second-generation cephalosporin (or gentamicin)
	Anaerobes (mainly Bacteroides)	with metronidazole (the use of oral, poorly absorbed antibiotics is
		controversial)

Table 4.7 SSI rates relating to wound contamination

Type of surgery Infection	rate (%)	Rate before prophylaxis
Clean (no viscus opened)	1–2	The same
Clean-contaminated (viscus opened, minimal spillage)	<10	Gastric surgery up to 30%
		Biliary surgery up to 20%
Contaminated (open viscus with spillage or inflammatory disease)	15–20	Variable but up to 60%
Dirty (pus or perforation, or incision through an abscess)	<40	Up to 60% or more

Table 4.6 Classification of antiseptics commonly used in general surgical practice						
Name	Presentation	Uses	Comments			
Chlorhexidine (Hibiscrub)	Alcoholic 0.5%	Skin preparation	Has cumulative effect. Effective against			
	Aqueous 4%	Skin preparation .	Surgical scrubGram-positive organisms and relatively			
		in dilu	te solutions in open stable in the presence of pus and bo body			
			wounds fluids			
Povidone-iodine (Betadine)	Alcoholic 10%	Skin preparation	Safe, fast-acting, broad spectrum. Some			
	Aqueous 7.5%	Skin preparation.	Surgical scrub insporicidal activity. Anti-fungal			
			dilute solutions in open woundsIodine is not free but combined with			
			polyvinylpyrrolidone (povidone)			
Cetrimide (Savlon)	Aqueous	Hand-washing	Pseudomonas spp. may grow in stored			
		Instrument and surfa	ce cleaning contaminated solutions. Ammonium			
			compounds have good detergent action			
			(surface-active agent)			
	Alcohols 70% ethyl, isopropy l	Skin preparation	Should be reserved for use as disinfectants			
Hypochlorites	Aqueous preparations	Instrument and sur	face cleaning Toxic to tissues			
			(Eusol, Milton, (debriding agent in open			
			Chloramine T) wounds?)			
Hexachlorophane	Aqueous bisphenol	Skin preparation F	I as action against Gram-negative			
		Hand-washing	organisms			

Principles for the use of antibiotic therapy

- Antibiotics do not replace surgical drainage of infection
- Only spreading infection or signs of systemic infection justifies the use of antibiotics
- Whenever possible, the organism and sensitivity should be Determined

Summary box 4.17

Treatment of commensals that have become opportunist pathogens

- They are likely to have multiple antibiotic resistance
- It may be necessary to rotate antibiotics

5.Surgery in the tropics

Summary box 5.1

Amoebiasis – pathology

- Entamoeba histolytica is the most common pathogenic amoeba in man
- The vast majority of carriers are asymptomatic
- Insanitary conditions and poor personal hygiene encourage transmission of the infection
- In the small intestine, the parasite hatches into

trophozoites, which invade the submucosa producing ulcers

■ In the portal circulation, the parasite causes liquefactive necrosis in the liver producing an abscess. This is the

commonest extraintestinal manifestation

- The majority of abscesses occur in the right lobe
- A mass in the course of the large bowel may indicate an amoeboma

Summary box 5.2

Diagnostic pointers for infection with Entamoeba histolytica

■ Bloody mucoid diarrhoea in a patient from an endemic

area or following a recent visit to such a country

- Upper abdominal pain, fever, cough, malaise
- In chronic cases, a mass in the right iliac fossa =amoeboma
- Sigmoidoscopy shows typical ulcers biopsy and scrapings may be diagnostic
- Serological tests are highly sensitive and specific outside endemic areas
- Ultrasound and CT scans are the imaging methods of Choice

Amoebiasis – treatment

- Medical treatment is very effective
- In large abscesses, repeated aspiration is combined with drug treatment
- Surgical treatment is reserved for complications such as

rupture into the pleural, peritoneal or pericardial cavities

■ Acute toxic megacolon and severe haemorrhage are

intestinal complications that are treated with intensive

supportive therapy followed by resection and exteriorisation

■ When an amoeboma is suspected in a colonic mass, cancer should be excluded by appropriate imaging

Summary box 5.9

Hydatid disease – diagnosis

- In the UK,the usual sufferer is a sheep farmer
- While any organ may be involved, the liver is by far the most commonly affected
- Elective clinical presentation is usually in the form of a painful lump arising from the liver
- Anaphylactic shock due to rupture of the hydatid cyst is the emergency presentation
- CT scan is the best imaging modality the diagnostic

feature is a space-occupying lesion with a smooth outline with septa

Summary box 5.10

Hydatid cyst of the liver - treatment

- Ideally managed in a tertiary unit by a multidisciplinary team of hepatobiliary surgeon, physician and interventional radiologist
- Leave asymptomatic and inactive cysts alone monitor size by ultrasound
- Active cysts should first be treated by a full course of albendazole

■ Several procedures are available – PAIR, pericystectomy with omentoplasty and hepatic segmentectomy; it is important to choose the most appropriate option ■ Increasingly, a laparoscopic approach is being tried Summary box 5.11 Mycobacterium leprae – pathology • Leprosy is a chronic curable infection caused by Mycobacterium leprae ■ It occurs mainly in tropical regions and developing countries ■ The majority of cases are located in the Indian subcontinent ■ Transmission is through nasal secretions ■ It is attributed to poor hygiene and insanitary conditions ■ The incubation period is several years ■ The initial infection occurs in childhood • Lepromatous leprosy denotes a poor host immune reaction • Tuberculoid leprosy occurs when host resistance is stronger than virulence of the organism Summary box 5.12 Leprosy – diagnosis • Typical clinical features and awareness of the disease should help to make a diagnosis

- The face has an aged look about it with collapse of the nasal bridge and eye changes
- Thickened peripheral nerves, patches of anaesthetic skin,

claw hands, foot drop and trophic ulcers are characteristic

Microbiological examination of the acid-fast bacillus and typical histology on skin biopsy are confirmatory

Leprosy - treatment

- Multiple drug therapy for a year
- Team approach
- Surgical reconstruction requires the expertise of a hand surgeon, orthopaedic surgeon and plastic surgeon
- Education of the patient and general public should be the keystone in prevention

Summary box 5.14

Poliomyelitis

- A viral illness that is preventable
- Presents with protean manifestations of fever, headache

and muscular paralysis without sensory loss, more frequently affecting the lower limbs

- Treatment is mainly medical and supportive in the early stages
- Surgery should only be undertaken after very careful

assessment as most patients learn to live with their disabilities

• Surgery is considered for the various types of paralysis in

the form of tendon transfers and arthrodesis, which is the domain of a specialised orthopaedic surgeon

Summary box 5.15

Pathology of tropical chronic pancreatitis

- Almost exclusively occurs in developing countries and is due to malnutrition; alcohol is not a cause
- Cassava ingestion is regarded as an aetiological factor because of its high content of cyanide compounds
- Dilatation of pancreatic ducts with large intraductal stones
- Fibrosis of the pancreas
- A high incidence of pancreatic cancer in those affected by the disease

Diagnosis of tropical chronic pancreatitis

- The usual sufferer is a type 1 diabetic under 40 years of age
- Serum amylase may be elevated in an acute exacerbation
- Plain X-ray shows stones along the pancreatic duct
- Ultrasound and CT scan of the pancreas confirm the diagnosis
- ERCP may be used as a supplementary investigation and a therapeutic procedure

Summary box 5.17

Tropical chronic pancreatitis - treatment

■ Mainly medical – pain relief, insulin for diabetes and pancreatic supplements for malnutrition

- Surgery is reserved for intractable pain
- Procedures are side-to-side pancreaticojejunostomy; resection in extreme cases

Summary box 5.18

Tuberculosis – pathology

- Increasingly being seen in the UK, mostly among immigrants
- Two types are recognised ulcerative and hyperplastic
- The ulcerative type occurs when the virulence of the organism is greater than the host defence
- The opposite occurs in the hyperplastic type

Small bowel strictures are common in the hyperplastic type, mainly affecting the ileocaecal area

- In the ulcerative type, the bowel serosa is studded with tubercles
- Localised areas of ascites occur in the form of cocoons
- The lungs and other organs may also be involved Simultaneously

Tuberculosis - clinical features

■ Intestinal tuberculosis should be suspected in any patient

from an endemic area who presents with weight loss,

malaise, evening fever, cough, alternating constipation and

diarrhoea and intermittent abdominal pain with distension

- The abdomen has a doughy feel; a mass may be found in the right iliac fossa
- The emergency patient presents with features of distal

small bowel obstruction - abdominal pain, distension, bilious and faeculent vomiting

• Peritonitis from a perforated tuberculous ulcer in the small bowel can be another emergency presentation

Summary box 5.20

Intestinal tuberculosis - investigations

- Raised inflammatory markers, anaemia and positive sputum culture
- Ultrasound of the abdomen may show localised areas of ascites
- Chest X-ray shows pulmonary infiltration
- Barium meal and follow-through shows multiple small

bowel strictures particularly in the ileum with a subhepatic caecum

■ If symptoms warrant, the genitourinary tract is also Investigated

Summary box 5.21

Tuberculosis – treatment

- Patients should ideally be under the combined care of a physician and surgeon
- Vigorous supportive and full drug treatment is mandatory in all cases
- Symptomatic strictures are treated by the appropriate

resection, e.g. local ileocolic resection or stricture plasty as

an elective procedure once the disease is completely under control

Acute intestinal obstruction from distal ileal stricture is

treated by thorough resuscitation followed by side-to-side ileotransverse bypass

• Once the patient has recovered with medical treatment,

then the second-stage definitive procedure of right hemicolectomy is done

One-stage resection and anastomosis can be considered if the patient's general condition permits

■ Perforation is treated by appropriate local resection and anastomosis or exteriorisation if the condition of the patient is very poor;this is later followed by restoration of bowel continuity after the patient has fully recovered with anti-tuberculous chemotherapy

Summary box 5.22

Diagnosis of bowel perforation secondary to typhoid

- The patient presents in, or has recently visited, an endemic area
- The patient has persistent high temperature and is very toxic
- Positive blood or stool cultures for Salmonella typhi and

the patient is already on treatment for typhoid

■ After the second week, signs of peritonitis usually denote

perforation, which is confirmed by the presence of free gas seen on X-ray

Summary box 5.23

Treatment of bowel perforation from typhoid

- Manage in intensive care
- Resuscitate and give intravenous antibiotics
- Laparotomy choice of various procedures
- Commonest site of perforation is the terminal ileum
- Having found a perforation, always look for others
- In the very ill patient, consider some form of exteriorisation
- Close the peritoneum and leave the wound open for secondary closure

6.Principles of paediatric surgery

Summary box 6.1

Anatomy of the paediatric abdomen

- The abdomen is wider and the bladder intra-abdominal
- Transverse supraumbilical incisions are preferred to vertical midline ones
- Scars may migrate during growth

Summary box 6.2

Special features that must be considered in children when preparing for surgery Problem Action ThermoregulationWarm fluids,warm theatre, insulate child Hypoglycaemia Maintain glucose above 2.6mmol l–1 Clotting Give intramuscular vitamin K preoperatively to neonates Fluid and electrolyte Allow for higher sodium and fluid balance needs Less postoperative Relatively lower postoperative catabolism energy requirements Gastro-oesophageal refluxUse a nasogastric tube to prevent aspiration Atypical presentations of High index of suspicion infection Psychology Trained staff,day surgery for minor operations

Table 6.2 Basic paediatric data

(a)Weight

Age	Weight (kg)
Term neonate	3.5
1 year	10
5 years	20
10 years	30

Approximate guide: weight $(kg) = 2 \times (age in years + 4)$.

(b)Vital signs	3		
Age (years)	Heart rate	Systolic blood	Respiratory
	(beats min-1)	pressure rate (mmHg)	(breaths min-1)
<1	110–160	70–90	30–40
2–5	90–140	80–100	25–30
5–12	80–120	90–110	20–25
Systolic blood press	ure ^a $80 + (age in years \times 2) mmH$	g.	
Circulating blood vo	lume ^a 80mlkg–1		
(90mlkg-1 in infant	s).		
(c)Maintenance fluid	l requirements		
Weigh	t	Daily fluid requirement (mlkg-1day-1)	
Neonate		120–150	
First 10kg		100	
Second 10kg		50	
Subsequent kg		20	

Special features of surgical technique in children

- Gentle tissue handling
- Bipolar diathermy is preferred to unipolar during dissection
- Abdominal incisions can be closed with absorbable sutures
- Bowel can be anastomosed with interrupted single-layer extramucosal sutures

■ Skin can be closed with absorbable subcuticular sutures

Summary box 6.4

Fluid resuscitation of the hypovolaemic child after trauma

■ Infuse 10mlkg–1

of normal saline or colloid

- Assess cardiovascular response
- Infuse 10mlkg–1
- of normal saline or colloid
- Assess cardiovascular response
- Repeat if necessary

■ If still hypovolaemic after a total of 40mlkg−1 of crystalloid, transfuse packed red cells and consider urgent surgery

Summary box 6.5

Paediatric trauma

- Use ATLS principles
- Overextension of the neck will compromise the airway
- Cervical spine injury can be present without radiographic signs
- Intraosseous vascular access is helpful in small children
- Lung contusion can occur without rib fractures
- Patterned skin bruising suggests underlying organ injury
- In a stable child, abdominal injuries are best assessed by CT
- Isolated liver or splenic injury can usually be managed non-operatively

Summary box 6.6

Inguinal hernias

- More common in premature boys
- 15% are bilateral
- Almost always indirect with a patent processus vaginalis
- Present with a groin lump that appears on straining or crying
- Incarcerated hernias can usually be reduced with gentle pressure
- If reduction is impossible emergency surgery is needed

■ In infants, they must be repaired promptly to prevent the risk of strangulation

■ The hernial sac is isolated then ligated and divided Proximally

Summary box 6.7

The undescended testis

- A retractile testis can be drawn down into the bottom of the scrotum
- An undescended testis may be in the groin or impalpable in the abdomen
- An ectopic testis lies outside the normal line of descent
- Orchidopexy involves mobilising the testis and placing it in a subdartos pouch
- Orchidopexy before 2 years of age improves fertility, may

reduce the risk of malignancy and has psychological benefits

Summary box 6.8

Diagnosis and treatment of the acute scrotum

- Torsion of the testis must be assumed until proven otherwise
- Testicular torsion can present with acute inguinal or abdominal pain
- Urgent surgical exploration is crucial if testicular torsion cannot be excluded
- Torsion of a testicular appendage usually occurs just before puberty
- An incarcerated inguinal hernia must be considered in the differential diagnosis

Summary box 6.9

Circumcision

- Medical indications are phimosis and recurrent balanoposthitis
- Circumcision is not indicated for an otherwise healthy non-retractile foreskin
- Complications include bleeding and damage to the glans

Infantile hypertrophic pyloric stenosis

- Most commonly affects boys aged 2–8 weeks
- Characterised by projectile vomiting after feeds
- Gastric peristalsis can be seen and a lump felt
- Fluid and electrolyte disturbances must be corrected before surgery
- Pyloromyotomy splits the hypertrophied muscle leaving the mucosa intact

Summary box 6.11

Presentation of intussusception

- Bilious vomiting in an infant is a sign of intestinal obstruction until proved otherwise
- Intussusception classically presents with colicky pain and vomiting
- Intussusception should be considered in any infant with bloody stools
- Peak incidence is between 5 and 10 months of age

Summary box 6.12

Management of intussusception

- Strangulation will result without treatment
- Most are ileocolic
- Diagnosis can be confirmed by ultrasound scan or contrast enema
- Fluid and electrolyte resuscitation is essential
- Most intussusceptions can be reduced non-operatively using an air or barium enema
- If there are signs of peritonitis or perforation then proceed to urgent surgery

Work-up of children with acute abdominal pain

- A careful history and examination and active observation are paramount
- Routine tests include urine analysis,microscopy and culture
- Frequently helpful tests:abdominal ultrasound scan (can

diagnose pelvic and urinary tract pathology, intussusception and other conditions)

• Occasionally helpful tests: a plain supine abdominal radiograph (particularly in the preschool child with pain and vomiting), urea and electrolytes and full blood count

Selective specific investigations:blood culture,stool

culture, plasma amylase, diagnostic laparoscopy

Summary box 6.14

Acute appendicitis

- Vomiting and loose stools may be present
- Tenderness and guarding in the right iliac fossa is characteristic
- Exclude referred pain from right lower lobe pneumonia
- Take special care in diagnosing appendicitis in the preschool child
- Surgery is the treatment of choice but only after fluid resuscitation and antibiotics

Summary box 6.15

Rarer causes of acute abdominal pain in children

- Obstruction from intussusception, adhesions, Meckel's diverticulum or a hernia
- Constipation
- Urinary tract disorders
- Gastroenteritis
- Ascariasis
- Typhoid

Urinary tract infection in children

- Needs prompt diagnosis, investigation and treatment to avoid permanent damage to kidneys
- Children often have an underlying urinary tract anomaly
- Symptoms are non-specific in infants
- Urine can be contaminated during collection
- The urinary tract should be checked with ultrasound in a confirmed urinary tract infection

Summary box 6.17

Rectal problems in children

- Constipation:in severe cases exclude Hirschsprung's disease and an anorectal malformation
- Rectal bleeding:consider anal fissure,intussusception, colitis and Meckel's diverticulum

Summary box 6.18

Swallowed or inhaled objects

- Most swallowed objects pass spontaneously
- Batteries need watching they must pass quickly if their contents are not to leak
- Objects jammed in the airways or oesophagus need Removing

Summary box 6.19

Congenital causes of intestinal obstruction

- Intestinal atresia:may be multiple
- Cystic fibrosis:can present with intestinal obstruction from inspissated meconium
- Intestinal malrotation:predisposes to potentially lethal midgut volvulus
- Alimentary tract duplications:may present with obstruction, haemorrhage or intussusception
- Hirschsprung's disease:typically presents with delay in passing meconium after birth
- Anorectal malformations:check the anus in babies with intestinal obstruction

PART 2: Investigation and diagnosis

10.Diagnostic imaging

Summary box 10.2

A simple system for checking radiographs

Label

Name of patient

Site Date of examination

Side (check marker)

What part is the film centred on?

Does the film cover the whole area required?Is there more than one view?

QualityIs the penetration appropriate?

CompareHow have the appearances changed from previous images?

ConcludeIs the diagnosis clear? Is further imaging needed?

Summary box 10.5

Ultrasound

Strengths

- No radiation
- Inexpensive
- Allows interaction with patients
- Superb soft-tissue resolution in the near field
- Dynamic studies can be performed
- First-line investigation for hepatic, biliary and renal disease
- Endocavitary ultrasound for gynaecological and prostate disorders
- Excellent resolution for breast, thyroid and testis imaging

- Excellent for cysts and foreign bodies
- Doppler studies allow assessment of blood flow

Weaknesses

- Interpretation only possible during the examination
- Long learning curve for some areas of expertise
- Resolution dependent on the machine available
- Images cannot be reliably reviewed away from the patient

Summary box 10.6

Computerised tomography

Strengths

- High spatial and contrast resolution
- Contrast resolution enhanced by imaging in arterial and/or venous phases
- Rapid acquisition of images in one breath-hold
- Imaging of choice for the detection of pulmonary masses
- Allows global assessment of the abdomen and pelvis
- Excellent for liver, pancreatic, renal and bowel pathology
- Three-dimensional reconstruction allows complex fracture imaging
- Multiplanar reconstruction and three-dimensional imagin e.g.CT angiography and colonoscopy

Weaknesses

- High radiation dose
- Poor soft-tissue resolution of the peripheries and superficial structures
- Patient needs to be able to lie flat and still

Summary box 10.7

Magnetic resonance imaging

Strengths

- No ionising radiation
- Excellent soft-tissue contrast
- Best imaging technique for Intracranial lesions, Spine, Bone marrow and joint lesions

Evolving use

- Staging
- MRCP
- MR angiography
- Breast malignancy
- Pelvic malignancy
- Cardiac imaging

Weaknesses

Absolute contraindications

Ocular metallic foreign bodies

Pacemakers

Cochlear implants

Cranial aneurysm clips

Relative contraindications

First trimester of pregnancy

Claustrophobia

Long scan times so patients may not be able to keep still,

especially if in pain

Limited availability

Expensive
Summary box 10.8

Radionuclide imaging

Strengths

- Allows functional imaging
- Allows imaging of the whole body
- Bone scan has a high sensitivity for metastatic bone disease, fractures and infection
- PET scanning is valuable in the detection of metastatic cancer

Weaknesses

- Specific agents are required for specific indications
- Often non-specific and an abnormal result may require further imaging
- Generally poor spatial resolution

Summary box 10.9

Types of imaging

- Radiographs are the best first-line test for bone lesions and fractures
- MRI is good for diagnosing bone marrow disease,occult

fractures and tendon and soft-tissue disorders

- CT enables visualisation of the fine detail of bony structures
- CT gives the best three-dimensional information on fractures
- Ultrasound has better resolution in accessible soft tissues and can be used dynamically
- Ultrasound is the best method of distinguishing solid from cystic lesions
- Ultrasound is the only method for locating non-metallic foreign bodies
- Ultrasound is the best method for detecting muscle Hernias

Summary box 10.10

Trauma imaging

- Initial imaging is radiography
- At least two views are needed
- Use CT for spine, intra-articular or occult fractures

Summary box 10.11

Imaging techniques for joint disease

- Radiographs are good for assessing established articular disease
- Synovitis can be detected using ultrasound or contrast- enhanced MRI
- Early damage to articular cartilage is difficult to image by conventional methods
- Rotator cuff lesions are best studied using ultrasound or MRI
- Destructive lesions are best studied first on plain radiographs
- MRI is best for staging tumours
- Biopsy can be guided by fluoroscopy,CT or ultrasound

Summary box 10.12

Imaging of aggressive lesions in bone

- Plain radiographs are important as a first investigation
- MRI is best for local staging
- Bone scintigraphy or whole-body MRI for solitary or multiple lesion determination
- CT detects lung metastases
- Fluoroscopy,CT,MRI or ultrasound can be used to guide the biopsy

Summary box 10.14

Imaging of potentially infected bone and joint

- Plain radiographs may be needed to exclude bone erosion
- Ultrasound is sensitive for an effusion, periosteal

collections and superficial abscesses and can be used for guided aspiration

- CT is useful in established infection to look for sequestrum
- MRI is useful to define the activity of osteomyelitis, early infection and soft-tissue collections
- Bone scans are sensitive but of low specificity
- Complex nuclear medicine studies are useful in negative

MR examinations or equivocal cases

Summary box 10.15

The investigation of the acute abdomen

Imaging tests

Chest radiography (erect)

Anterior radiograph (supine)

Indications/signs

Free gas under the diaphragm

Dilated bowel/gas pattern

Gas inside/outside bowel

Obstruction

Closed loop

Bowel wall oedema

Renal colic Ureteric obstruction by stone Ascites Cholecystitis/biliary colic

IVU

Ultrasound

J		
		Renal colic and bladder stones
		Abscess
		Obstruction – dilated fluid-filled bowel
	Focused high-resolution D	iverticulitis
	ultrasound A	ppendicitis
	Вс	owel wall thickening/
	at	oscess
	CT scan Sev	ere pancreatitis
	Div	verticulitis
	Ab	scess
	Sma	all bowel obstruction (high grade)
	Воч	vel infarction
	Focused CT scan Ap	pendicitis
	Ur	eteric colic

11.Gastrointestinal endoscopy

Summary box 11.2

The risks of endoscopy

- Sedation
- Damage to dentition
- Aspiration
- Perforation or haemorrhage after endoscopic dilatation
- Perforation, infection and aspiration after percutaneous endoscopic gastrostomy insertion
- Perforation or haemorrhage after flexible

sigmoidoscopy/colonoscopy with polypectomy

Pancreatitis, cholangitis, perforation or bleeding after

endoscopic retrograde cholangiopancreatography

Summary box 11.4

Managing anticoagulants in patients undergoing endoscopy

It is important to recognise and understand:

The risk of complications related to the underlying

gastrointestinal disease from anticoagulant therapy

■ The risk of haemorrhage related to an endoscopic

procedure in the setting of anticoagulant therapy

■ The risk of a thromboembolic/ischaemic event related to interruptions of anticoagulant therapy

Summary box 11.5

Recommendations concerning anticoagulant management

Low-risk procedures

- No adjustment to anticoagulation required
- Avoid elective procedures when anticoagulation is above the therapeutic range

High-risk procedure in a patient with a low-risk condition

- Discontinue warfarin 3–5 days before the procedure
- Consider checking the international normalised ratio on the day of the procedure

High-risk procedure in a patient with a high-risk condition

- Discontinue warfarin 3–5 days before the procedure
- Warfarin may be resumed the night of the procedure
- The decision to administer intravenous heparin should be individualised
- Intravenous heparin should be discontinued 4–6 hours

before the procedure and may be resumed 2-6 hours after the procedure

• Heparin and warfarin should overlap until the international

normalised ratio has stabilised within the therapeutic range

■ The use of ambulatory low molecular weight heparin should be considered

Summary box 11.6

Symptoms of endoscopic oesophageal perforation

- Neck/chest pain
- Abdominal pain
- Increasing tachycardia
- Hypotension
- Surgical emphysema

Summary box 11.7

Current established indications for single/double- balloon endoscopy

- Bleeding from the gastrointestinal tract of obscure cause
- Iron deficiency anaemia with normal colonoscopy and gastroscopy
- Visualisation of and therapeutic intervention for abnormalities seen on traditional small bowel imaging/capsule endoscopy

Summary box 11.8

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Indications for colonoscopy
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- Rectal bleeding with looser or more frequent stools +/-abdominal pain related to bowel actions
- Iron deficiency anaemia (after biochemical confirmation+/– negative coeliac serology):

oesophagogastroduodenoscopy and colonoscopy together

- Right iliac fossa mass if ultrasound is suggestive of colonicorigin
- Change in bowel habit assoc iated with fever/elevated inflammatory response

■ Chronic diarrhoea (> 6 weeks) after sigmoidoscopy/rectal biopsy and negative coeliac serology

- Follow-up of colorectal cancer and polyps
- Screening of patients with a family history of colorectal cancer
- Assessment/removal of a lesion seen on radiological examination

- Assessment of ulcerative colitis/Crohn's extent and activity
- Surveillance of inflammatory bowel disease
- Surveillance of acromegaly/ureterosigmoidostomy

12.Tissue diagnosis

Summary box 12.1

Reasons for tissue analysis

- To make new diagnoses
- To confirm suspected clinical diagnoses
- To exclude other diagnoses
- To assist with prognosis
- To help plan treatment
- Audit

Summary box 12.2

Common types of tissue sample

Histology

Formalin-fixed tissue

Biopsy

Mucosal

Punch

Needle

Excision

Resection

Fresh tissue (usually for frozen section)

■ Cytology

Cervical

Washings, brushings

Fine-needle aspirate (FNA)

Fluids

Summary box 12.5

Microscopic features of malignancy

- Metastasis
- Invasion

Of surrounding tissue

Vascular

Perineurial

- Architectural abnormalities
- Necrosis
- Numerous mitotic figures
- Atypical mitotic figures
- Nuclear abnormalities

Pleomorphism

Enlargement

Hyperchromaticity

Chromatin clumping

■ Nucleolar enlargement and multiplicity

Summary box 12.6

Causes of false-positive diagnoses of malignancy

- Interchanged samples
- Contamination

- Interpretative error
- Treatment-induced change
- Ulceration

Summary box 12.7

Cytology compared with histology

Advantages:

- Wider area may be sampled
- Sampling may be less invasive
- Fast
- Cheap
- Can be interpreted by non-medical staff

Disadvantages:

- Cannot assess tissue architecture
- Less amenable to further studies

Summary box 12.10

Common special stains

- PAS:glycogen,fungi
- D-PAS:mucin
- Perls Prussian blue:iron
- Reticulin:reticulin fibres
- van Gieson:collagen
- Congo red:amyloid
- Ziehl–Neelsen:mycobacteria

PART 3: Perioperative care 13.Preoperative preparation

Summary box 13.1

Preoperative patient preparation

- Gather and record concisely all relevant information
- Devise a plan to minimise risk and maximise benefit for the patient
- Consider possible adverse events and plan how to deal with them
- Communicate to ensure that everyone (including the patient) understands the surgical plan

Summary box 13.2

Principles of history-taking

- Listen:what does the patient see as the problem? (Open questions)
- Clarify:what does the patient expect? (Closed questions)
- Narrow the differential diagnosis.(Focused questions)
- Fitness:what other comorbidities exist? (Fixed questions)

Summary box 13.3

Features of the history of the presenting complaint to explore

- Symptoms, including features not present
- Onset
- Relieving factors
- Exacerbating factors
- Pain, nature of the pain, any radiation, etc.
- Other therapies
- Planned surgery
- Expectations

Key topics to review when taking the past medical

history

Cardiovascular

- Ischaemic heart disease angina, myocardial infarctiona
- Hypertensiona
- Heart failure
- Dysrhythmias
- Peripheral vascular disease
- Deep vein thrombosis and pulmonary embolisma
- Anaemia

Respiratory

- Chronic obstructive pulmonary disease
- Asthmaa
- Fibrotic lung conditions
- Respiratory infections
- Malignancy

Gastrointestinal

- Peptic ulcer disease and gastro-oesophageal reflux
- Bowel habit bleeding per rectum, obstruction
- Malignancy
- Liver disease jaundice, alcohol, coagulopathy

Genitourinary tract

- Urinary tract infection
- Prostatisma
- Renal dysfunction

Neurological

- Epilepsy
- Cerebrovascular accidents and transient ischaemic

attacks

- Psychiatric disorders
- Cognitive function

Endocrine/metabolic

- Diabetes
- Thyroid dysfunction
- Phaeochromocytoma
- Porphyria

Locomotor system

- Osteoarthritis
- Inflammatory arthropathy such as rheumatoid arthritis,

including neck instability

Infectious diseases

- Human immunodeficiency virus
- Hepatitis
- Tuberculosis

Previous surgery

- Types of anaesthetic and any problems encountereda
- Have any members of the patient's family had particular problems with anaesthesia?

These probably need recording even when negative as they are so important.

Key topics in the general medical examination

General

Anaemia, jaundice, cyanosis, nutritional status, teeth, feet,

leg ulcers (sources of infection)

Cardiovascular

Pulse, blood pressure, heart sounds, bruits, peripheral

pulses, peripheral oedema

Respiratory

Respiratory rate and effort, chest expansion and

percussion note, breath sounds, oxygen saturation

Gastrointestinal

Abdominal masses, ascites, bowel sounds, bruits, herniae, genitalia

Neurological

• Conscious level, any pre-existing cognitive impairment or

confusion, deafness, neurological status of limbs

Summary box 13.6

Key points in the management plan discussion

- Provide all of the information necessary for the patient to make an informed decision
- Use language that the patient will understand
- Discuss the options rather than telling the patient what will be done
- Give the patient time to think things over
- Encourage the patient to discuss things with a trusted friend/partner

■ Suggest that the patient write down a list of points that he or she wishes to discuss

Summary box 13.7

Preoperative transfusions

- Consider transfusion if haemoglobin level is less than 8gdl-1
- Consider carefully which products to use
- Order and write up blood products clearly
- Give the blood at a sensible time of day
- Consider co-administration of a loop diuretic
- Be prepared to treat any reactions rapidly

Summary box 13.8

Problems of surgery in the obese

Increased risk of:

- Difficulty intubating
- Aspiration
- Myocardial infarction
- Cerebrovascular accident
- Deep vein thrombosis and pulmonary embolism
- Respiratory compromise
- Poor wound healing/infection
- Pressure sores
- Mechanical problems lifting,transferring,operating table

weight limits

Summary box 13.9

Surgery in the jaundiced patient

Causes of jaundice:

- Hepatic hepatitis,cholangitis,alcohol
- Post-hepatic biliary obstruction,drugs

Secondary complications of surgery:

- Clotting disorders
- Hepatorenal syndrome
- Infection

Summary box 13.10

Renal impairment

■ Prerenal:

Dehydration

Poor perfusion

■ Renal:

Acute - volume depletion, platelet function, immunosuppression

Chronic - fluid balance ,?dialysis,? transplantation

■ Postrenal:

Obstruction - calculi ,prostate, blocked catheter

Summary box 13.11

Surgical risks for the diabetic patient

- Increased risk of sepsis local and general
- Neuropathic complications pressure care
- Vascular complications cardiovascular, cerebrovascular, peripheral

- Renal complications
- Fluid and electrolyte disturbances

Summary box 13.12

Risk factors for thrombosis

- Increasing age
- Significant medical comorbidities (particularly malignancy)
- Trauma or surgery (especially of the abdomen, pelvis and lower limbs)
- Pregnancy/puerperium
- Immobility (including a lower limb plaster)
- Obesity
- Family/personal history of thrombosis
- Drugs,e.g.oestrogen,smoking

Summary box 13.13

Risk groups for thrombosis

Low risk

- Minor surgery (less than 30min), no risk factors, any age
- Major surgery (more than 30min), no risk factors, less than age 40
- Minor trauma or medical illness Moderate risk
- Major surgery (not orthopaedic or abdominal cancer),age 40+ or other risk factor
- Major medical illness,trauma or burns
- Minor surgery, trauma or illness in patient with a family/personal history

High risk

■ Major surgery (elective or trauma orthopaedic,cancer) of

the pelvis, hip or lower limb

■ Major surgery,trauma or illness in a patient with a

family/personal history

■ Lower limb paralysis/amputation

Summary box 13.14

Prophylaxis against thrombosis

Mechanical

- Early mobilisation
- Neuraxial anaesthesia
- Leg compression stockings
- Calf and foot pumps

Pharmacological

- Heparin and low molecular weight heparin
- Warfarin
- Aspirin
- Pentasaccharides (e.g.fondaparinux inhibits activated factor X)
- Direct thrombin inhibitors (e.g.melagatran and ximelagatran)

15.Care in the operating room

Summary box 15.1

Preoperative checks with the patien

- Patient's name
- Condition
- Consent mark side
- All investigations available
- Sepsis
- Pre-existing complications

Summary box 15.5

Scrubbing

- Do not scrub if you have an infection
- Make sure all hair is covered and that you are protected from splashes
- Start scrubbing before, and finish after, the senior surgeon
- Dry hands from distal to proximal

16.Perioperative management of

the high-risk surgical patient

Summary box 16.1

Characteristics of the high-risk population

- Elderly
- Comorbid conditions
- Needing emergency surgery (no time for optimisation)

Summary box 16.2

Surgical and anaesthetic factors creating high risk

Dehydration (shock before surgery, loss of fluids during

surgery, inability to tolerate fluids postoperatively)

- Pain (reduces mobility, affects breathing and ability to take food and fluids)
- Hypothermia

Summary box 16.4

Preoperative assessment for risk

- The history should focus on cardiac and respiratory problems
- Exercise tolerance gives a good guide to cardiac reserve

- Age and body mass index are useful indicators
- Check alcohol and tobacco intake
- Check medications

Summary box 16.5

Review medical treatment before surgery

- Coronary angiography may be indicated for patients with ischaemic heart disease
- Asthma and COAD may require bronchodilators and steroids
- Antibiotic therapy is not necessarily indicated for patien with chronic sputum production
- Patients should stop smoking
- Patients with renal failure need their surgery planned around dialysis
- Oral medication can be given with water even when a patient is 'nil by mouth'
- When possible, postpone surgery until the patient is Optimized

Summary box 16.8

General critical care

- Blood glucose tight control using an insulin sliding scale
- Blood transfusion reaction harden threshold for transfusion to 8gdl –1
- Steroids if there are signs of adrenocortical depression
- Start enteral feeding early (jejunal feeding tubes)
- Protect against deep vein thrombosis

17. Nutrition and fluid therapy

Summary box 17.1

Metabolic response to starvation

- Low plasma insulin
- High plasma glucagon
- Hepatic glycogenolysis
- Protein catabolism
- Hepatic gluconeogenesis
- Lipolysis:mobilisation of fat stores
- Adaptive ketogenesis
- Reduction in resting energy expenditure (15–20kcalkg–1day–1)

Summary box 17.2

Metabolic response to trauma and sepsis

- Increased counter-regulatory hormones: adrenaline, noradrenaline, cortisol, glucagon and growth hormone
- Increased energy requirements (up to 40kcalkg-1day-1)
- Increased nitrogen requirements
- Insulin resistance and glucose intolerance
- Preferential oxidation of lipids
- Increased gluconeogenesis and protein catabolism
- Loss of adaptive ketogenesis
- Fluid retention with associated hypoalbuminaemia

Summary box 17.3

Complications of enteral nutrition

Tube-related

- Malposition
- Displacement
- Blockage
- Breakage/leakage
- Local complications (e.g.erosion of skin/mucosa)

Gastrointestinal

- Diarrhoea
- Bloating, nausea, vomiting
- Abdominal cramps
- Aspiration
- Constipation Metabolic/biochemical
- Electrolyte disorders
- Vitamin, mineral, trace element deficiencies
- Drug interactions Infective
- Exogenous (handling contamination)
- Endogenous (patient)

Summary box 17.4

Complications of parenteral nutrition Related to nutrient deficiency

- Hypoglycaemia/hypocalcaemia/hypophosphataemia/ hypomagnesaemia (refeeding syndrome)
- Chronic deficiency syndromes (essential fatty acids,zinc, mineral and trace elements)

Related to overfeeding

■ Excess glucose:hyperglycaemia,hyperosmolar dehydration,hepatic steatosis,hypercapnia,increased

sympathetic activity,fluid retention,electrolyte abnormalities

Excess fat:hypercholesterolaemia and formation of

lipoprotein X, hypertriglyceridaemia, hypersensitivity reactions

Excess amino acids: hyperchloraemic metabolic acidosis,

hypercalcaemia, aminoacidaemia, uraemia Related to sepsis

- Catheter-related sepsis
- Possible increased predisposition to systemic sepsis Related to line

• On insertion:pneumothorax,damage to adjacent artery, air embolism,thoracic duct damage,cardiac perforation or tamponade,pleural effusion,hydromediastinum

■ Long-term use:occlusion,venous thrombosis

18.Basic surgical skills and

Anastomoses

Summary box 18.1

Closure of wounds

- Wound edges should be left slightly gaping to allow swelling
- Edges should be everted
- The knot should be placed to one side of the wound
- Knots must be secure, with the ends long enough to grasp when removing the suture

Summary box 18.8

Complications after anastomosis Leakage

- Bowel peritonitis
- Vessel haematoma, haemorrhagic shock (early), pseudoaneurysm (late) Stenosis
- Bowel obstruction after fibrous stricture or disease recurrence
- Vessel (early and late) thrombosis, occlusion, gangrene

19.Principles of laparoscopic and

robotic surgery

Summary box 19.1

Advantages of minimal access surgery

- Decrease in wound size
- Reduction in wound infection, dehiscence, bleeding, herniation and nerve entrapment
- Decrease in wound pain
- Improved mobility
- Decreased wound trauma
- Decreased heat loss
- Improved vision

Summary box 19.2

Limitations of minimal access surgery

- Reliance on remote vision and operating
- Loss of tactile feedback
- Dependence on hand-eye coordination
- Difficulty with haemostasis
- Reliance on new techniques
- Extraction of large specimens

Summary box 19.3

Preparation for laparoscopic or robotic surgery

Overall fitness:cardiac arrhythmia,emphysema

- Previous surgery:scars,adhesions
- Body habitus:obesity,skeletal deformity
- Normal coagulation

■ Thromboprophylaxis

■ Informed consent Preparation is very similar to that for open surgery and aims to ensure that:

- The patient is fit for the procedure
- The patient is fully informed and has consented
- Operative difficulty is predicted when possible
- Appropriate theatre time and facilities are available (especially important for robotic cases)

20.Postoperative care

Summary box 20.1

Postoperative period

- Ensure airway, breathing and circulation are satisfactory
- Monitor pain
- Watch for complications
- Monitor blood pressure, pulse and oxygen saturation

Summary box 20.2

Complications associated with monitoring systems

- Air embolism
- Phlebitis
- Finger necrosis

Summary box 20.3

Causes of acute postoperative shortness of breath

- Myocardial infarction and heart failure
- Pulmonary embolism

- Chest infection
- Exacerbation of asthma or chronic obstructive airway Disease

Summary box 20.4

Low blood pressure postoperatively

- Is the patient dehydrated?
- Has the patient had an epidural anaesthetic?
- Is the patient losing blood?
- Is the patient on too much morphine?
- Has the patient had a myocardial infarct?

Summary box 20.5

Risk factors for DVT

- Age >60 years
- Recent surgery, particularly pelvic and lower limb surgery

- Immobilisation
- Trauma
- Oral contraceptive pill
- Obesity
- Heart failure
- Cancer
- Arteriopathy

Summary box 20.6

Stratification of risk of DVT

Low

- Maxillofacial surgery
- Neurosurgery
- Cardiothoracic surgery

Medium

- Inguinal hernia repair
- Abdominal surgery
- Gynaecological surgery
- Urological surgery

High

- Pelvic elective and trauma surgery
- Total knee and hip replacement

Summary box 20.7

Prevention of DVT

- Early mobilisation
- Hydration
- Compression stockings
- Low molecular weight heparin as prophylaxis
- Calf pumps
- Minimise use of tourniquets

Table 20.2 Common causes of acute renal failure

Prerenal

Hypotension

Hypovolaemia

Renal

Nephrotoxic drugs

Gentamicin

Steroids

Myoglobinuria

Sepsis

Postrenal

Ureteric injury

Blocked urethral catheter

Table 20.1 Treatment of postoperative nausea and vomiting

General measures

Adequate pain control

Avoid opiates

Keep stomach empty by aspirating (consider

nasogastric tubes)

Start oral feeding slowly

Maintain hydration and blood pressure

Epidural analgesia

Drugs

Dopamine receptor antagonists, e.g.

prochlorperazine

Metoclopramide

H1 receptor antagonists, e.g. cyclizine

5HT receptor antagonists, e.g. ondansetron

Summary box 20.8

Compartment syndrome

- Symptoms are pain, pain, pain
 - Pain is greater than expected and unresponsive to analgesia
 - The earliest sign is pain on passive stretching of muscles in the affected compartment
 - Paralysis, paraesthesia and pulselessness are very late signs

Summary box 20.9

Fever

- A very common problem postoperatively
- Consider problems in the lung, urine and wound

Summary box 20.10

Preventing pressure sores

- Address nutritional status
- Keep patients mobile or regularly turned if bed-bound

Table 20.4 Causes of confusion Renal Renal failure/uraemia Hyponatraemia and electrolyte disorders Urinary tract infection Urinary retention RespiratoryHypoxia, e.g. chest infection Atelectasis Cardiovascular Pulmonary embolism Dehydration Septic shock Myocardial infarction

Chronic heart failure Arrhythmia Drugs Opiates including heroin Hypnotics Cocaine Alcohol withdrawal Hypoglycaemia NeurologicalEpilepsy Encephalopathy Head injury Cerebrovascular accident Idiopathic (rare)Hypothyroid Hyperthyroidism Addison's disease

Summary box 20.11

Complications of blood transfusion

- Allergy
- Transmission of infection

Summary box 20.12

Risk factors in wound dehiscence

General

- Malnourishment
- Diabetes

- Obesity
- Renal failure
- Jaundice
- Sepsis
- Cancer
- Patients on steroids

Local

- Inadequate or poor closure of wound
- Poor local wound healing,e.g. because of infection, haematoma or seroma
- Increased intra-abdominal pressure, e.g.in postoperative

patients suffering from chronic obstructive airway disease, during excessive coughing

PART 4: Trauma 22.Early assessment and management of trauma

Summary box 22.1

The steps in the ATLS philosophy

- Primary survey with simultaneous resuscitation identify and treat what is killing the patient
- Secondary survey proceed to identify all other injuries
- Definitive care develop a definitive management plan

Summary box 22.3

Types of injury

- Blunt,e.g.car bonnet
- Penetrating,e.g.knife
- Blast,e.g.bomb
- Crush,e.g.building collapse
- Thermal

Summary box 22.4

Crush injury

■ Muscle cells die.If reperfused,they release myoglobin

- Injured tissue sequesters fluid
- Renal shutdown results
- Treatment is fluid loading with monitoring of renal output to maintain dieresis

Summary box 22.6

ABCDE of trauma care

- \blacksquare A Airway maintenance and cervical spine protection
- \blacksquare B Breathing and ventilation
- \blacksquare C Circulation with haemorrhage control
- D Disability:neurological status
- \blacksquare E Exposure:completely undress the patient and assess for other injuries

Summary box 22.7

Airway assessment

- Check verbal response
- Clear mouth and airway with large-bore sucker
- If GCS 8, consider a definitive airway; otherwise use jaw thrust or chin lift

Summary box 22.8

Breathing

- Give 100% oxygen at high flow
- Check for tension pneumothorax
- Decompress at once if tension pneumothorax is suspected

(needle in the second intercostal space)

Summary box 22.9

Circulation (assessment and warning signs)

Deteriorating conscious state

Pallor

• Rapid thready pulse is a more reliable and earlier warning sign than a fall in blood pressure

Summary box 22.10

Adjuncts to the primary survey

- Blood FBC, urea and electrolytes, clotting screen, glucose, toxicology, cross-match
- ECG
- Two wide-bore cannulae for intravenous fluids
- Urinary and gastric catheters
- Radiographs of the cervical spine and chest

Summary box 22.11

Review of patient's history (AMPLE)

- Allergy
- Medication including tetanus status
- Past medical history
- Last meal
- Events of the incident

Table 22.2 Urine output by age in the paediatric population

Age	Optimal urine output
Infant (<1 year)	2mlkg-1h-1
Preschool (1–5 years)	1.5mlkg–1h–1
Child-adolescent (6-16 year	rs) 1mlkg–1h–1

23.Head injury

Summary box 23.1

Causes of secondary brain injury

- Hypoxia:PO2 <8kPa
- Hypotension:systolic blood pressure (SBP) <90mmHg
- Raised intracranial pressure (ICP):ICP >20mmHg
- Low cerebral perfusion pressure (CPP):CPP <65mmHg
- Pyrexia
- Seizures
- Metabolic disturbance

Summary box 23.2

Taking a history in head injury

- Mechanism of injury
- Loss of consciousness or amnesia
- Level of consciousness at scene and on transfer
- Evidence of seizures
- Probable hypoxia or hypotension
- Pre-existing medical conditions
- Medications (especially anticoagulants)

Illicit drugs and alcohol

Summary box 23.3

Examination in head injury

- Glasgow Coma Score
- Pupil size and response

- Lateralising signs
- Signs of base of skull fracture
- Bilateral periorbital oedaema (raccoon eyes)
- Battle's sign (bruising over mastoid)
- Cerebrospinal fluid rhinorrhoea or otorrhoea
- Haemotympanum or bleeding from ear
- Full neurological examination:tone,power,sensation, reflexes

Summary box 23.4

NICE guidelines for computerised tomography (CT) in head injury

- Glasgow Coma Score (GCS) <13 at any point
- GCS 13 or 14 at 2 hours
- Focal neurological deficit
- Suspected open, depressed or basal skull fracture
- Seizure
- Vomiting > one episode

Urgent CT head scan if none of the above but:

- Age >65
- Coagulopathy (e.g.on warfarin)
- Dangerous mechanism of injury (CT within 8 hours)
- Antegrade amnesia >30 min (CT within 8 hours)

Summary box 23.5

Surgical management of raised intracranial pressure

- Early evacuation of focal haematomas:EDH,ASDH
- Cerebrospinal fluid drainage via ventriculostomy
- Delayed evacuation of swelling contusions
- Decompressive craniectomy

Summary box 23.6

Medical management of raised intracranial pressure

- Position head up 30°
- Avoid obstruction of venous drainage from head
- Sedation +/- muscle relaxant
- Normocapnia 4.5–5.0kPa
- Diuretics:furosemide,mannitol
- Seizure control
- Normothermia
- Sodium balance
- Barbiturates

Table 23.2 Glasgow Outcome Score (GOS)

Good recovery	5
Moderate disability	4
Severe disability	3
Persistent vegetative state	2
Dead	1
24.Neck and spine

Summary box 24.2

Spinal column anatomy

- Upper cervical spine stability is dependent on ligamentous restraints
- Major energy transfer is required to significantly disrupt the thoracic spine
- The cervicothoracic and thoracolumbar junction are transitional zones and are therefore prone to injury
- The need for surgical fixation of a spine fracture depends

upon the stability of the fracture type

Summary box 24.5

Physical examination

- Shock after spinal injury can be hypovolaemic, Neurogenic or spinal
- The ASIA scoring system should be used to evaluate patients with spinal cord injury
- Prognoses of spinal injury depends on the type of injury

Summary box 24.6

Diagnostic imaging of spinal injuries

- Clear visualisation of the cervicothoracic junction is essential
- Plain cervical spine radiographs fail to identity 15% of injuries
- The prevertebral soft tissue shadow should be evaluated carefully

Summary box 24.7

Management of spinal trauma

• The management of spinal trauma depends on the presence or absence of neurological deficit

Deteriorating neurological status is an absolute indication for surgical intervention

■ Many spinal cord injury units no longer advocate the use of high-dose corticosteroids

Summary box 24.8

Cervical spine injuries

- The majority of upper cervical spinal injuries are treated non-operatively
- Spinal cord injury is more commonly associated with subaxial cervical spinal injuries
- In cases of facet dislocation a pre-traction MRI should be Considered

Summary box 24.9

Thoracic and thoracolumbar fractures

■ Unstable thoracic spine fractures are commonly associated with vascular and/or visceral injuries

■ Thoracolumbar flexion–distraction injuries may result in duodenal,pancreatic and/or aortic rupture

26.Chest and abdomen

Summary box 26.1

Trauma to the abdomen

- The proportion of patients surviving severe torso injury until arrival at hospital is increasing
- 40% of all trauma deaths are a result of torso injury
- Rapid assessment and resuscitation will improve survival rates

Summary box 26.2

Junctional zones

Neck

- Mediastinum
- Diaphragm
- Groin
- Retroperitoneum

Injuries in these large zones pose diagnostic and treatment Problems

Summary box 26.4

Closed management of chest injuries

- About 80% of chest injuries can be managed closed
- If there is an open wound insert a chest drain
- Do not close a sucking chest wound until a drain is in place
- If bleeding persists, the chest will need to be opened

Summary box 26.3

Investigation of chest injuries

- Directly or indirectly involved in 50% of trauma deaths in the USA
- 80% can be managed non-operatively
- A chest radiograph is the investigation of first choice
- A spiral CT scan provides rapid diagnoses in the chest and abdomen
- A chest drain can be diagnostic as well as therapeutic

Summary box 26.6

Liver trauma

- Blunt trauma occurs as the result of direct compression
- Penetrating trauma of the upper abdomen or lower thorax can damage the liver

■ CT scanning is the investigation of choice

- Surgical management consists of push, Pringle, plug and pack
- The hepatic artery can be tied off but not the portal vein (stent)
- Closed suction should always be used

Summary box 26.7

Injuries to structures in the abdomen

- In children splenic injury can be managed non-operatively
- Duodenal injuries are associated with pancreatic damage
- Small bowel injuries need urgent repair
- Large bowel injuries can be resected and stapled off in damage limitation surgery
- Rectal injuries may be best managed initially with a defunctioning colostomy
- Kidney and urinary tract damage is best diagnosed with enhanced CT scanning
- Intra-abdominal bladder tears need formal repair and Drainage

Table 26.8 Indications for damage control surgery

Anatomical

Inability to achieve haemostasis Complex abdominal injury, e.g. liver and pancreas Combined vascular, solid and hollow organ injury, e.g. aortic or caval injury Inaccessible major venous injury, e.g. retrohepatic vena cava Demand for non-operative control of other injuries, e.g. fractured pelvis Anticipated need for a time-consuming procedure

Physiological (decline of physiological reserve)

Temperature <34°C

pH <7.2

Serum lactate >5mmoll-1

[N (Normal) <2.5mmoll-1]

Prothrombin time (PT) >16s Partial thromboplastin time (PTT) >60s >10 units blood transfused Systolic blood pressure <90mmHg for >60 min **Environmental** Operating time >60 min Inability to approximate the abdominal incision Desire to reassess the intra-abdominal contents (directed relook)

Summary box 26.8

Damage control

- Resuscitation is carried out in the operating room using biologically active fluids
- Surgery is the minimum needed to stabilise the patient
- The aim of surgery is control of haemorrhage and limitation of contamination
- Secondary surgery is aimed at definitive repair

Table 27.1 Extremity injuries not to missPosterior dislocation of the shoulderLateral condylar mass fracture of the distal humerusPeri-lunate dislocationScaphoid fractureTarsometatarsal fracture dislocationCompartment syndromeVascular injury with knee dislocationTalar neck fractureSlipped upper femoral epiphysisAchilles tendon rupture

28.Burns

Summary box 28.1

Prevention of burns

- A significant proportion of burns can be prevented by:
- Implementing good health and safety regulations
- Educating the public
- Introducing of effective legislation

Summary box 28.2

Warning signs of burns to the respiratory system

- Burns around the face and neck
- A history of being trapped in a burning room
- Change in voice
- Stridor

Summary box 28.3

Dangers of smoke, hot gas or steam inhalation

- Inhaled hot gases can cause supraglottic airway burns and laryngeal oedema
- Inhaled steam can cause subglottic burns and loss of respiratory epithelium
- Inhaled smoke particles can cause chemical alveolitis and respiratory failure
- Inhaled poisons, such as carbon monoxide, can cause metabolic poisoning
- Full-thickness burns to the chest can cause mechanical blockage to rib movement

Summary box 28.4

The shock reaction after burns

- Burns produce an inflammatory reaction
- This leads to vastly increased vascular permeability

- Water, solutes and proteins move from the intra- to the extravascular space
- The volume of fluid lost is directly proportional to the area of the burn
- Above 15% of surface area, the loss of fluid produces shock

Summary box 28.6

Major determinants of the outcome of a burn

- Percentage surface area involved
- Depth of burns
- Presence of an inhalational injury

Summary box 28.7

The criteria for acute admission to a burns unit

- Suspected airway or inhalational injury
- Any burn likely to require fluid resuscitation
- Any burn likely to require surgery
- Patients with burns of any significance to the hands, face, feet or perineum
- Patients whose psychiatric or social background makes it inadvisable to send them home
- Any suspicion of non-accidental injury
- Any burn in a patient at the extremes of age
- Any burn with associated potentially serious sequelae

including high-tension electrical burns and concentrated hydrofluoric acid burns

Summary box 28.8

Initial management of the burned airway

- Early elective intubation is safest
- Delay can make intubation very difficult because of swelling

■ Be ready to perform an emergency cricothyroidotomy if intubation is delayed

Summary box 28.9

Recognition of the potentially burned airway

- A history of being trapped in the presence of smoke or hot gases
- Burns on the palate or nasal mucosa, or loss of all the hairs in the nose
- Deep burns around the mouth and neck

Summary box 28.10

Assessing the area of a burn

- The patient's whole hand is 1% TBSA, and is a useful guide in small burns
- The Lund and Browder chart is useful in larger burns
- The rule of nines is adequate for a first approximation only

Summary box 28.11

Assessing the depth of a burn

- The history is important temperature, time and burning material
- Superficial burns have capillary filling
- Deep partial-thickness burns do not blanch but have some sensation
- Full-thickness burns feel leathery and have no sensation

Summary box 28.12

Fluids for resuscitation

■ In children with burns over 10% TBSA and adults with

burns over 15% TBSA, consider the need for intravenous fluid resuscitation

- If oral fluids are to be used, salt must be added
- Fluids needed can be calculated from a standard formula

■ The key is to monitor urine output

Summary box 28.13

Options for topical treatment of deep burns

- 1% silver sulphadiazine cream
- 0.5% silver nitrate solution
- Mafenide acetate cream
- Serum nitrate, silver sulphadiazine and cerium nitrate

Summary box 28.14

Principles of dressings for burns

■ Full-thickness and deep dermal burns need antibacterial

dressings to delay colonisation prior to surgery

- Superficial burns will heal and need simple dressings
- An optimal healing environment can make a difference to

outcome in borderline depth burns

Summary box 28.15

Nutrition in burns patients

- Burns patients need extra feeding
- A nasogastric tube should be used in all patients with burns over 15% of TBSA
- Removing the burn and achieving healing stops the catabolic drive

Summary box 28.16

Infection control in burns patients

Burns patients are immunocompromised

- Sterile precautions must be rigorous
- Swabs should be taken regularly
- A rise in white blood cell count,thrombocytosis and

increased catabolism are warnings of infection

Summary box 28.17

Surgical treatment of deep burns

- Deep dermal burns need tangential shaving and split-skin grafting
- All but the smallest full-thickness burns need surgery
- The anaesthetist needs to be ready for significant blood loss
- Topical adrenaline reduces bleeding
- All burnt tissue needs to be excised
- Stable cover, permanent or temporary, should be applied at once to reduce burn load

Summary box 28.18

Delayed reconstruction of burns

- Eyelids must be treated before exposure keratitis arises
- Transposition flaps and Z-plasties with or without tissue expansion are useful
- Full-thickness grafts and free flaps may be needed for large or difficult areas
- Hypertrophy is treated with pressure garments
- Pharmacological treatment of itch is important

Summary box 28.19

Electrical burns

- Low-voltage injuries cause small,localised,deep burns
- They can cause cardiac arrest through pacing interruption

without significant direct myocardial damage

- High-voltage injuries damage by flash (external burn) and conduction (internal burn)
- Myocardium may be directly damaged without pacing interruption
- Limbs may need fasciotomies or amputation
- Look for and treat acidosis and myoglobinuria

Summary box 28.20

Chemical burns

- Damage is from corrosion and poisoning
- Copious lavage with water helps in most cases
- Then identify the chemical and assess the risks of Absorption

Summary box 28.21

Radiation burns

Local burns causing ulceration need excision and

vascularised flap cover - usually with free flaps

Systemic overdose needs supportive treatment

Summary box 28.22

Cold injuries

- The damage is more difficult to define and slower to develop than burns
- Acute frostbite needs rapid rewarming,then observation
- Delay surgery until demarcation is clear

PART 8: Breast and endocrine 48.The thyroid and parathyroid glands

Summary box 48.1

Embryology and anatomy

- Know the embryology of the thyroid and parathyroid glands
- Know the surgical and radiological anatomy of the thyroid

Summary box 48.2

Thyroid investigations

Essential

- Serum:TSH (T3and T4 if abnormal);thyroid autoantibodies
- FNAC of palpable discrete swellings;ultrasound guidance may reduce the 'Thy1'rate

Optional

- Corrected serum calcium
- Serum calcitonin (carcinoembryonic antigen may be used

as an alternative screening test for medullary cancer)

■ Imaging:chest radiograph and thoracic inlet if tracheal

deviation/retrosternal goitre;ultrasound,CT and MRI scan for known cancer,some reoperations and some retrosternal goitres;isotope scan if discrete swelling and toxicity coexist

Summary box 48.3

Thyroid swellings

- Know how to describe thyroid swellings
- Use appropriate investigations

	■ Know the indications for surgery
_	Select the appropriate procedure
	 Describe and manage postoperative complications
_	Table 48.4 Classification of thyroid swellings
	Simple goitre (euthyroid)
_	Diffuse hyperplastic
	Physiological
_	Pubertal
	Pregnancy
_	Multinodular goitre
	Toxic
	Diffuse
	Graves' disease
	Multinodular
	Toxic adenoma
	Neoplastic
	Benign
	Malignant
	Inflammatory
	Autoimmune
	Chronic lymphocytic thyroiditis
	Hashimoto's disease
	Granulomatous
	De Quervain's thyroiditis
	Fibrosing

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	Riedel's thyroiditis
_	Infective
	Acute (bacterial thyroiditis, viral thyroiditis, 'subacute thyroiditis')
_	Chronic (tuberculous, syphilitic)
	Other
_	Amyloid
	Summary box 48.4
_	Thyroid operations
	All thyroid operations can be assembled from three basic
_	elements:
	■ Total lobectomy
_	■ Isthmusectomy
	■ Subtotal lobectomy
	Total thyroidectomy= $2 \times \text{total lobectomy}$ + isthmusectomy
	Subtotal thyroidectomy= $2 \times$ subtotal lobectomy+ isthmusectomy
_	Near-total thryroidectomy= total lobectomy+
_	isthmusectomy+subtotal lobectomy
	Lobectomy=total lobectomy+isthmusectomy
	Table 48.5 Indications for operation in thyroid swellings
_	Neoplasia
	FNAC positive
	Clinical suspicion, including:
	Age
	Male sex

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Hard texture Fixity Recurrent laryngeal nerve palsy Lymphadenopathy Recurrent cyst Toxic adenoma Pressure symptoms Cosmesis Patient's wishes Cardiac rhythm arrhythmias are: 1 multiple extrasystoles;

2 paroxysmal atrial tachycardia;

3 paroxysmal atrial fibrillation;

4 persistent atrial fibrillation, not responsive to digoxin.

Summary box 48.5

Hyperthyroidism

- Describe the causes
- Discuss the pros and cons of the three major treatment options
- Know how to prepare a patient for operation
- Describe appropriate surgical procedures
- Know about early and late postoperative management

Table 48.7 Classification of thyroid neoplasms

Benign
Follicular adenoma
Malignant
Primary
Follicular epithelium – differentiated
Follicular
Papillary
Follicular epithelium – undifferentiated
Anaplastic
Parafollicular cells
Medullary
Lymphoid cells
Lymphoma
Secondary
Metastatic
Local infiltration
Summary box 48.6

Thyroid cancer

- Know the different pathological types and their behaviour
- Use appropriate investigations
- Be aware of the controversies in treatment
- Know about risk stratification and the possible effect on treatment
- Describe total thyroidectomy and node dissection
- Know how to manage the complications
- Understand the role of postoperative radioiodine therapy

Summary box 48.7

Thyroiditis

- Be aware of the common and uncommon forms of thyroiditis
- Understand their effects on thyroid function

Summary box 48.8

Management of postoperative hypocalcaemia

- Check serum calcium within 24 hours of total thyroidectomy or earlier if symptomatic
- Medical emergency if the level is <1.90mmoll-1:correct

with 10ml of 10% calcium gluconate intravenously;10ml

of 10% magnesium sulphate intravenously may also be required

■ Give 1g of oral calcium three or four times daily

■ Give 1–3µg daily of oral 1-alpha-vitamin D if necessary

50.The breast

Summary box 50.1

Discharges from the nipple (the principal causes are italicised)

Discharge from the surface

- Paget's disease
- Skin diseases (eczema, psoriasis)
- Rare causes (e.g.chancre)

Discharge from a single duct

Blood-stained:

- Intraduct papilloma
- Intraduct carcinoma

Duct ectasia

Serous (any colour):

- Fibrocystic disease
- Duct ectasia
- Carcinoma

Discharge from more than one duct

Blood-stained:

- Carcinoma
- Ectasia
- Fibrocystic disease

Black or green:

■ Duct ectasia

Purulent:

Infection

Serous:

- Fibrocystic disease
- Duct ectasia
- Carcinoma

Milk:

- Lactation
- Rare causes (hypothyroidism,pituitary tumour)

Summary box 50.2

Benign breast disorder classification

Congenital disorders

■ Inverted nipple

- Non-breast disorders
- Tietze's disease (costochondritis)
- Sebaceous cysts and other skin conditions Injury Inflammation/infection

ANDI (aberations of normal differentiation and involution):

- Cyclical nodularity and mastalgia
- Cysts
- Fibroadenoma

Duct ectasia/periductal mastitis

Pregnancy-related:

- Galactocele
- Puerperal abscess

Summary box 50.3

Algorithm for management of operable breast cancer

Achieve local control

Appropriate surgery

- Wide local excision (clear margins) and radiotherapy, or
- Mastectomy ±radiotherapy (offer reconstruction immediate or delayed)
- Combined with axillary procedure (see text)
- Await pathology and receptor measurements
- Use risk assessment tool;stage if appropriate Treat risk of systemic disease
- Offer chemotherapy if prognostic factors poor;include Herceptin if Her-2 positive
- Radiotherapy as decided above
- Hormone therapy if oestrogen receptor or progesterone receptor positive

Summary box 50.4

The aims of treatment are:

- 'Cure': likely in some patients but late recurrence is possible
- Control of local disease in the breast and axilla
- Conservation of local form and function
- Prevention or delay of the occurrence of distant metastases

PART 9: Cardiothoracic

52.The thorax

Summary box 52.1

Pneumothorax

■ Patient comfortable:

-watch

– PO2

monitoring

■ Pneumothorax complete or patient breathless:

-aspirate

- Aspiration fails or patient hypoxic:
- -insert chest drain
- Patient ill:
- -immediate drainage

Summary box 52.2

Suction on a pleural tube

Beware! Inserting the drain, and not the suction, is the life- saving manoeuvre

- If the lung is reluctant to expand, the suction deviates the mediastinum
- If the lung is fragile, it may worsen an air leak

Summary box 52.3

Biopsy of the pleura

■ Cytological examination of the pleural fluid (low yield)

Abrams' needle (low yield in malignancy)

■ VATS biopsy

Open surgical biopsy

VATS is the preferred technique for mesothelioma but

CT-guided biopsy is increasingly used and is effective.

Table 52.3 Conditions that predispose to empyema formation

Pulmonary infection

Unresolved pneumonia

	Bronchiectasis			
	Tuberculosis			
	Fungal infections			
	Lung abscess			
Aspiration of pleural effusion	Any aetiology			
Trauma				
	Penetrating injury			
	Surgery			
Oesophageal	perforation			
Extrapulmonary sources	Subphrenic abscess			
Bone infections	Osteomyelitis of ribs or vertebrae			
Summary box 52.4				

Biopsy hazards

- Bleeding disorders
- Systemic anticoagulation
- Pulmonary hypertension

Table 52.5 Causes of airway narrowing

Intraluminal

Inhaled foreign body

Neoplasm

Intramural

Congenital stenosis

Fibrous stricture (post-intubation or tuberculosis)

Extramural

Neoplasm (thyroid cancer, secondary deposits)

Aortic arch aneurysm

Summary box 52.5

Symptoms of lung cancer

- Haemoptysis <50% of patients
- Cough, new or changed pattern
- Pain
- Dyspnoea
- Clubbing
- Hoarseness
- Myopathies

Summary box 52.6

Tuberculosis: indications for surgery

Suspicious lesion on chest radiograph in which neoplasia

cannot be excluded

- Chronic tuberculous abscess, resistant to chemotherapy
- Aspergilloma within a tuberculous cavity
- Life-threatening haemoptysis

PART 10: Vascular 53.Arterial disorders

Summary box 53.1

Features of lower limb arterial stenosis or occlusion

- Intermittent claudication
- Rest pain
- Cold,numb,paraesthesia,colour change
- Ulceration
- Gangrene
- Assumes ambient temperature
- Sensation decreased
- Movement diminished or lost
- Arterial pulsation diminished or absent

- Arterial bruit
- Slow venous refilling

Summary box 53.2

Indications for amputation

Dead limb

■ Gangrene

Deadly limb

- Wet gangrene
- Spreading cellulitis
- Arteriovenous fistula
- Other (e.g.malignancy)

'Dead loss' limb

- Severe rest pain
- Paralysis
- Other (e.g.contracture,trauma)

Summary box 53.3

Classification of aneurysms Wall

- True (three layers:intima,media,adventitia)
- False (single layer of fibrous tissue)

Morphology

- Fusiform
- Saccular
- Dissecting

Aetiology

- Atheromatous
- Mycotic (bacterial rather than fungal)
- Collagen disease
- Traumatic

Summary box 53.4

Management of ruptured abdominal aortic aneurysm

Early diagnosis (abdominal/back pain, pulsatile mass, shock)

- Immediate resuscitation (oxygen,intravenous replacement therapy,central line)
- Maintain systolic pressure,but not >100mmHg
- Urinary catheter
- Cross-match six units of blood
- Rapid transfer to the operating room

Summary box 53.5

Abdominal aortic aneurysm: indications for operation

Asymptomatic

- Aneurysm >55mm in anteroposterior diameter
- Patient fit for surgery (expected mortality rate <5%)
- Indications for endoluminal operation are the same as for open operation

Symptomatic

- Aneurysm of any size that is painful or tender
- Aneurysm of any size that is causing distal embolisation
- Indications are wider than for an asymptomatic lesion (expected mortality rate 5–20%)

Table 54.1 Risk factors for venous thromboembolism

Patient factors Age

Obesity

Varicose veins

Immobility

Pregnancy

Puerperium

High-dose oestrogen therapy

Previous deep vein thrombosis or

pulmonary embolism Thrombophilia Disease or surgical Trauma or surgery, especially of procedure pelvis, hip and lower limb Malignancy, especially pelvic, and abdominal metastatic Heart failure Recent myocardial infarction Paralysis of lower limb(s) Infection Inflammatory bowel disease Nephrotic syndrome Polycythaemia Paraproteinaemia Paroxysmal nocturnal haemoglobinuria antibody or lupus anticoagulant Behçet's disease Homocystinaemia

PART 11: Abdominal

56.History and examination of the abdomen

Summary box 56.1

The history

■ The single most important factor in obtaining a reliable

diagnosis from the history is its comprehensiveness

- History is also important in determining fitness for surgery
- Previous surgery needs careful documentation as it affects the safety of laparoscopic procedures
- If a comprehensive suite of investigations is not available,

the history becomes even more important

Summary box 56.2

Format for surgical history-taking

- Presenting complaint
- History of presenting complaint
- Associated features (including systemic review of the

relevant system, e.g. gastrointestinal, urological, etc.)

- Past medical and surgical history
- Systems review
- Drug/allergy history
- Family history
- Social history

Summary box 56.3

Medical causes of abdominal pain

- Diabetic ketoacidosis
- Porphyria
- Pain arising from the heart or lungs

Table 56.1 Embryological division of the gastrointestinal tract

Viscera

Foregut Oesophagus

Stomach

Duodenum - first and second parts

Pancreas

Liver

Gall bladder

MidgutDuodenum - third and fourth parts

Jejunum

Ileum

Right colon

Transverse colon

Appendix

HindgutLeft colon

Sigmoid colon

Rectum

Summary box 56.4 Origins and presentation of abdominal pain Source Presentation Parietal peritoneumWell localised but can radiate forwards and backwards along the dermatome Visceral peritoneumPoorly localised;associated with sweating and nausea Retroperitoneal structuresPain in the back

Summary box 56.5

Sources of pain that evolve over hours or days

■ AcuteAppendicitis

Cholecystitis

Salpingitis

Mesenteric adenitis

- Infarction
- Free blood in the peritoneum

Summary box 56.6

Causes of sudden onset abdominal pain

PerforationAppendix

Stomach

Duodenum

Colon

Summary box 56.7

Aggravating features of pain

Aggravating feature Interpretation

Moving or coughing Peritoneal inflammation Patient rolls around with painColic (suggests obstruction of viscus)

Summary box 56.8

Abdominal examination (inspection)

- Analgesia should not be withheld
- Observe the abdomen before palpation
- Make a careful check for scars

Summary box 56.9

Abdominal examination (palpation)

- Check for pain first with superficial palpation
- Masses can be localised by checking for mobility (while patient lifts legs)
- Rebound tenderness suggests peritoneal inflammation
- Board-like rigidity suggests generalised peritonitis

Summary box 56.10

Ascites

- Produces distension and dullness to percussion in the flanks
- The dullness 'shifts' as the patient is rolled onto their side

Summary box 56.11

Pelvic examination

- Palpation for tenderness
- Rectal examination for tenderness and blood
- Proctoscopy for haemorrhoids, fissure and anal tumour
- Sigmoidoscopy for rectal tumours, inflammation and ulceration

Summary box 56.12

Source of change in bowel sounds

- Gurgling and high pitched = Obstruction
- Absent = Peritonitis or ileus
- Bruits = Vascular

57.Hernias, umbilicus and abdominal wall

Summary box 57.1

Causes of hernias

- Coughing
- Straining
- Obesity
- Intra-abdominal malignancy

Summary box 57.2

Types of hernia

- Reducible contents can be returned to abdomen
- Irreducible contents cannot be returned but there are other complications
- Obstructed bowel in the hernia has good blood supp but bowel is obstructed

- Strangulated blood supply of bowel is obstructed
- Inflamed contents of sac have become inflamed

Summary box 57.3

Natural history of hernias

■ Irreducible hernias – there is a risk of strangulation at any time

■ Obstructed hernias – usually go on to strangulation

■ Strangulated hernias – gangrene can occur within 6 hours

Summary box 57.4

Strangulated hernias

- Present with local then general abdominal pain and vomiting
- A normal hernia can strangulate at any time
- Most common in hernias with narrow necks such as femoral hernias
- Require urgent surgery

Summary box 57.5

Natural history of inguinal hernias

- Inguinal hernias in babies are the result of a persistent processus vaginalis
- Indirect inguinal hernia is the most common hernia of all, especially in the young
- Direct inguinal hernia becomes more common in the Elderly

Summary box 57.6

Treatment of hernias

- Surgery is the treatment of choice
- Surgery is either open or laparoscopic
- Any hernia can strangulate

Summary box 57.7

Direct inguinal hernias

- All are acquired
- They are most common in older men

■ They rarely strangulate

Summary box 57.8

Preoperative treatment of strangulated inguinal hernias

- Resuscitate with adequate fluids
- Empty stomach with nasogastric tube
- Give antibiotics to contain infection
- Catheterise to monitor haemodynamic state

Summary box 57.9

Non-operative treatment of hernias

- Only indicated in children
- Forcible reduction must never be attempted

Summary box 57.10

Recurrence of hernias

- The recurrence rate after surgery should be less than 2%
- Some recurrences will be new hernias

Summary box 57.11

Femoral hernias

- More common in women
- Cannot be controlled with a truss
- Have a high incidence of strangulation
- Should be operated on as soon as possible

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Summary box 57.12
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Exomphalmos

- Small defects may result in the sac being tied off with cord
- Large defects need a staged approach

Summary box 57.13

Umbilical hernias in infants and children

- Rarely strangulate
- Most resolve spontaneously

Summary box 57.14

Paraumbilical hernias

- Usually occur in obese women
- Will increase in size and may get very large indeed
- May strangulate so need surgery

Summary box 57.15

Epigastric hernias

- Too small to contain bowel
- Only need surgery if painful

Summary box 57.16

Infection of umbilical cord

- Most become infected
- Staff must wash hands between patients to prevent cross- infection

Summary box 57.18

Incisional hernias

- Rarely strangulate
- Large ones may be dangerous to reduce

Summary box 57.19

Tear of epigastric artery

- Follows a bout of coughing
- May mimic intra-abdominal sepsis

58.The peritoneum, omentum

Summary box 58.1

Functions of the peritoneum

- Pain perception (parietal peritoneum)
- Visceral lubrication
- Fluid and particulate absorption
- Inflammatory and immune responses
- Fibrinolytic activity

Summary box 58.2

Causes of a peritoneal inflammatory exudate

- Bacterial infection, e.g. appendicitis, tuberculosis
- Chemical injury, e.g. bile peritonitis
- Ischaemic injury,e.g.strangulated bowel,vascular occlusion

- Direct trauma,e.g.operation
- Allergic reaction,e.g.starch peritonitis
Summary box 58.3

Bacteria in peritonitis

Gastrointestinal source

- Escherichia coli
- Streptococci (aerobic and anaerob
- Bacteroides
- Clostridium
- Klebsiella pneumoniae
- Staphylococcus

Other sources

- Chlamydia
- Gonococcus
- b-Haemolytic streptococci
- Pneumococcus
- Mycobacterium tuberculosis

Summary box 58.4

Paths to peritoneal infection

- Gastrointestinal perforation, e.g. perforated ulcer, diverticular perforation
- Exogenous contamination, e.g. drains, open surgery, trauma
- Transmural bacterial translocation (no perforation),e.g. inflammatory bowel disease,appendicitis,ischaemic bowel

- Female genital tract infection,e.g.pelvic inflammatory disease
- Haematogenous spread (rare),e.g.septicaemia

Summary box 58.5

Clinical features in peritonitis

- Abdominal pain, worse on movement
- Guarding/rigidity of abdominal wall
- Pain/tenderness on rectal/vaginal examination (pelvic peritonitis)
- Pyrexia (may be absent)
- Raised pulse rate
- Absent or reduced bowel sounds
- 'Septic shock' [systemic inflammatory response syndrome (SIRS)] in later stages

Summary box 58.6

Investigations in peritonitis

- Raised white cell count and C-reactive protein are usual
- Serum amylase >4× normal indicates acute pancreatitis
- Abdominal radiographs are occasionally helpful
- Erect chest radiographs may show free peritoneal gas (perforated viscus)
- Ultrasound/CT scanning often diagnostic
- Peritoneal fluid aspiration (with or without ultrasound guidance) may be helpful

Summary box 58.7

Management of peritonitis

General care of patient:

- Correction of fluid and electrolyte imbalance
- Insertion of nasogastric drainage tube
- Broad-spectrum antibiotic therapy
- Analgesia

■ Vital system support

Operative treatment of cause when appropriate with peritoneal debridement/lavage

Summary box 58.8

Systemic complications of peritonitis

- Bacteraemic/endotoxic shock
- Bronchopneumonia/respiratory failure
- Renal failure
- Bone marrow suppression
- Multisystem failure

Summary box 58.9

Abdominal complications of peritonitis

- Adhesional small bowel obstruction
- Paralytic ileus
- Residual or recurrent abscess
- Portal pyaemia/liver abscess

Summary box 58.11

Causes of bile peritonitis

- Perforated cholecystitis
- Post cholecystectomy:

Cystic duct stump leakage

Leakage from an accessory duct in the gall bladder bed

Bile duct injury

T-tube drain dislodgement (or tract rupture on removal)

Following other operations/procedures:
 Leaking duodenal stump post gastrectomy
 Leaking biliary–enteric anastomosis
 Leakage around percutaneous placed biliary drains
 Following liver trauma

Summary box 58.12

Tuberculous peritonitis

- Acute and chronic forms
- Abdominal pain, sweats, malaise and weight loss are frequent
- Caseating peritoneal nodules are common distinguish

from metastatic carcinoma and fat necrosis of pancreatitis

- Ascites common, may be loculated
- Intestinal obstruction may respond to anti-tuberculous treatment without surgery

Summary box 58.13

Causes of ascites

Transudates (protein < 25gl-1)

• Low plasma protein concentrations:

Malnutrition

Nephrotic syndrome

Protein-losing enteropathy

■ High central venous pressure:

Congestive cardiac failure

Portal hypertension:

Portal vein thrombosis Cirrhosis

Exudates (protein > 25gl-1)

- Tuberculous peritonitis
- Peritoneal malignancy
- Budd–Chiari syndrome (hepatic vein occlusion or thrombosis)
- Pancreatic ascites
- Chylous ascites
- Meigs'syndrome

Summary box 58.14

Conditions of the mesentery

- Traumatic tears
- Torsion
- Embolism/thrombosis
- Acute non-specific adenitis
- Tuberculous adenitis
- Cysts
- Neoplasms benign and malignant

Summary box 58.15

Causes of retroperitoneal fibrosis

Benign

- Idiopathic (Ormond's disease)
- Chronic inflammation
- Extravasation of urine
- Retroperitoneal irritation by leakage of blood or intestinal content

■ Aortic aneurysm ('inflammatory type')

- Trauma
- Drugs:

Chemotherapeutic agents

Methysergide

β-Adrenoceptor antagonists

Malignant

- Lymphoma
- Carcinoid tumours
- Secondary deposits (especially from carcinoma of stomach, colon, breast and prostate)

59.The oesophagus

Summary box 59.1

Symptoms of oesophageal disease

■ Difficulty in swallowing described as food or fluid sticking (oesophageal dysphagia)

Must rule out malignancy

- Pain on swallowing (odynophagia) Suggests inflammation and ulceration
- Regurgitation or reflux (heartburn) Common in gastro-oesophageal reflux disease
- Chest pain

Difficult to distinguish from cardiac pain

Summary box 59.2

Foreign bodies

- The most common is a food bolus, which usually signifies underlying disease
- It is usually possible to remove foreign bodies by flexible endoscopy
- Beware of button batteries in the oesophagus

Summary box 59.3

Perforation of the oesophagus

- Potentially lethal complication due to mediastinitis and septic shock
- Numerous causes, but may be iatrogenic
- Surgical emphysema is virtually pathognomonic
- Treatment is urgent; it may be conservative or surgical, but requires specialised care

Summary box 59.4

Instrumental perforation

Prevention of perforation is better than cure

Summary box 59.5

Corrosive injury

■ Skilled early endoscopy is mandatory

Summary Box 59.6

Diagnostic measurement in GORD

- 24-hour pH recording is the 'gold standard' for diagnosis of GORD
- TLOSRs are the most important manometric findings in GORD
- The length and pressure of the LOS are also important

Summary box 59.8

Peptic stricture

■ Day-case dilatation and PPI for peptic stricture

Summary box 59.8

GORD

Is due to loss of competence of the LOS and is extremely common

■ May be associated with a hiatus hernia, which may be

sliding or, less commonly, rolling (paraoesophageal)

■ The most common symptoms are heartburn,epigastric

discomfort and regurgitation, often made worse by stooping and lying

Achalasia and GORD are diagnostically easily confused

- Dysphagia may occur, but a neoplasm must be excluded
- Diagnosis and treatment can be instituted on clinical grounds

Endoscopy may be required and 24-hour pH is the 'gold standard'

■ Management is primarily medical (PPIs being the most

effective), but surgery may be required; laparoscopic fundoplication is the most popular technique

■ Stricture may develop in time

Summary box 59.9

Barrett's oesophagus

- Intestinal metaplasia is an important risk factor for the development of adenocarcinoma
- Do not confuse Barrett's ulcer with oesophagitis

Summary box 59.10

'Rolling'hiatus hernia

Potentially dangerous, because of volvulus

Carcinoma of the oesophagus

■ Squamous cell usually affects the upper two-thirds;

adenocarcinoma usually affects the lower third

■ Common aetiological factors are tobacco and alcohol

(squamous cell) and GORD (adenocarcinoma)

- The incidence of adenocarcinoma is increasing
- Lymph node involvement is a bad prognostic factor
- Dysphagia is the most common presenting symptom, bu is a late feature
- Accurate pretreatment staging is essential in patients thought to be fit to undergo 'curative'treatment

Summary box 59.12

Treatment of carcinoma of the oesophagus

- Radical oesophagectomy is the most important aspect of curative treatment
- Neoadjuvant treatments before surgery may improve survival in a proportion of patients
- Chemoradiotherapy alone may cure selected patients, particularly those with squamous cell cancers
- Useful palliation may be achieved by chemo/radiotherapy or endoscopic treatments

Summary box 59.13

Oesophagogastric surgery

- Beware of satellite nodules proximal to the primary lesion
- Carefully preserve the blood supply of the stomach, both venous and arterial
- Right thoracic approach gives easy access to the Oesophagus

Summary box 59.14

Post oesophagectomy

- Reflux may be a problem following resection
- Symptoms may be atypical
- Reflux may be limited or avoided by subtotal

oesophagectomy and gastric transposition high in the chest

Summary box 59.15

Alternative therapeutic approaches

• Chemoradiotherapy may be a useful alternative to surgery, especially in unfit patients

Summary box 59.16

Palliation should be simple and effective

Summary box 59.17

Oesophageal motility disorders

- May be part of a more diffuse gastrointestinal motil problem
- May be associated with GORD

Summary box 59.18

Achalasia

- Is uncommon
- Is due to selective loss of inhibitory neurones in the lower oesophagus
- The causes dysphagia and carcinoma must be excluded
- Treatment is by either endoscopic dilatation or surgical Myotomy

Summary box 59.19

Lower oesophageal stricture

Beware pseudoachalasia;look for tumour

Summary box 59.20

Achalasia

- Beware perforation due to dilatation of achalasia
- Beware postoperative reflux

Summary box 59.21

Oesophageal diverticula

Diverticula are indicators of a motor disorder and not necessarily the cause of symptoms

60.Stomach and duodenum

Summary box 60.1

The anatomy and physiology of the stomach

- The stomach acts as a reservoir for food and commences the process of digestion
- Gastric acid is produced by a proton pump in the parietal

cells, which in turn is controlled by histamine acting on the H2 -receptors

■ Histamine is produced by the endocrine gastric ECL cells

in response to a number of factors, particularly gastrin and the vagus

- Proton pump inhibitors abolish gastric acid production, whereas H2
 -receptor antagonists only markedly reduce it
- The gastric mucous layer is essential to the integrity of the gastric mucosa

Summary box 60.2

The investigation of gastric disorders

- Flexible endoscopy is the most sensitive and commonly used technique
- Great care is necessary in performing endoscopy to avoid

complications and missing important pathology

Axial imaging, particularly multislice CT, is useful in the staging of gastric cancer,

although it may be less sensitive in the detection of liver metastases than other modalities

- CT/PET is useful in staging gastric cancer
- Endoscopic ultrasound is the most sensitive technique in

the evaluation of the 'T'stage of gastric cancer and in the assessment of duodenal tumours

■ Laparoscopy is sensitive in detecting peritoneal metastases, and laparoscopic ultrasound provides an accurate evaluation of lymph node and liver metastases

Summary box 60.3

Gastritis

■ The spiral bacterium H.pylori is critical in the development of type B gastritis, peptic ulceration and gastric cancer

■ Infection appears to be acquired mainly in childhood and

the infection rate is inversely associated to socio-economic status

■ Eradication, recommended specifically in patients with peptic ulcer disease, can be achieved in up to 90% of patients with a combination of a proton pump inhibitor and antibiotics, and reinfection is uncommon

• Erosive gastritis is usually related to the use of non- steroidal anti-inflammatory drugs (NSAIDs)

■ Type A gastritis is an autoimmune process and is associated with the development of gastric cancer

Summary box 60.4

Peptic ulceration

■ Most peptic ulcers are caused by H.pylori or NSAIDs and

changes in epidemiology mirror changes in these principal aetiological factors

• Duodenal ulcers are more common than gastric ulcers, but the symptoms are indistinguishable

Gastric ulcers may become malignant and an ulcerated

gastric cancer may mimic a benign ulcer

■ Gastric anti-secretory agents and H.pylori eradication

therapy are the mainstay of treatment, and elective surgery is rarely performed now

- The long-term complications of peptic ulcer surgery may be difficult to treat
- The common complications of peptic ulcers are perforation, bleeding and stenosis
- The treatment of the perforated peptic ulcer is primarily

surgical, although some patients may be managed conservatively

Table 60.4 Causes of upper gastrointestinal bleeding

Condition	Incidence (%)
Ulcers	60
Oesophageal	6
Gastric	21
Duodenal	33
Erosions	26
Oesophageal	13
Gastric	9
Duodenal	4
Mallory–Weiss tear	4
Oesophageal varices	4

			-(
Tumour	0.5			
Vascular lesions,				
e.g. Dieulafoy's disease	0.5			
Others	5			
Summary box 60.5				
Gastric outlet obstruction				
 Gastric outlet obstruction is most commonly associated 				
with longstanding peptic ulcer disease and gastric cancer				
The metabolic abnormality of hypochloraemic alkalosis is				
usually only seen with peptic ulcer disease and should be				
treated with isotonic saline with potassium supplementation				

- Endoscopic biopsy is essential to determine whether the cause of the problem is malignancy
- Endoscopic dilatation of the gastric outlet may be effective in the less severe cases of benign stenosis
- Operation is normally required, with a drainage procedure

being performed for benign disease and appropriate resectional surgery if malignant

Summary box 60.6

Gastric cancer

- Gastric cancer is one of the most common causes of cancer death in the world
- The outlook is generally poor because of the advanced stage at presentation
- Better results are obtained in Japan, which has a high

population incidence, screening programmes and high- quality surgical treatment

■ The actiology of gastric cancer is multifactorial; H.pylori is

an important factor for distal but not proximal gastric cancer

• Early gastric cancer is associated with very high cure rates

■ Gastric cancer can be classified into intestinal and diffuse types, the latter having a worse prognosis

■ In the west, proximal gastric cancer is now more common

than distal cancer and is usually of the diffuse type

■ Spread may be by lymphatics,blood,transcoelomic or

direct, but distant metastases are uncommon in the absence of lymph node involvement

■ The treatment of curable cases is by radical surgery,and

removal of the second tier of nodes (around the principal arterial trunks) may be advantageous

Gastric cancer is chemosensitive and chemotherapy

improves survival both in patients having curative surgery and with advanced disease

Summary box 60.7

Duodenal tumours

Duodenal villous adenomas are commonly found around

the ampulla of Vater and are pre-malignant

Duodenal carcinoma is uncommon, but the commonest

site for adenocarcinoma in the small intestine

■ Both adenoma and carcinoma occur commonly in patients

with familial polyposis and screening these patients is advised

Pancreatic cancer is the most common cause of duodenal obstruction

61.The liver

Summary box 61.1

Liver anatomy

- The liver regenerates after partial resection
- There are two anatomical lobes with separate blood

supply, bile duct and venous drainage

■ Dual blood supply (20% hepatic artery and 80% portal vein)

Summary box 61.2

Main functions of the liver

- Maintaining core body temperature
- pH balance and correction of lactic acidosis
- Synthesis of clotting factors
- Glucose metabolism,glycolysis and gluconeogenesis
- Urea formation from protein catabolism
- Bilirubin formation from haemoglobin degradation
- Drug and hormone metabolism
- Removal of gut endotoxins and foreign antigens

Summary box 61.3

Causes of acute liver failure

- Viral hepatitis (hepatitis A,B,C,D,E)
- Drug reactions [halothane, isoniazid-rifampicin,

antidepressants, non-steroidal anti-inflammatory drugs, valproic acid]

- Paracetamol overdose
- Mushroom poisoning

- Shock and multiorgan failure
- Acute Budd–Chiari syndrome
- Wilson's disease
- Fatty liver of pregnancy

Summary box 61.4

Supportive therapy for acute liver failure

- Fluid balance and electrolytes
- Acid–base balance and blood glucose monitorin
- Nutrition
- Renal function (haemofiltration)
- Respiratory support (ventilation)
- Monitoring and treatment of cerebral oedema
- Treat bacterial and fungal infection

Summary box 61.6

Features of chronic liver disease

- Lethargy
- Fever
- Jaundice
- Protein catabolism (wasting)
- Coagulopathy (bruising)
- Cardiac (hyperdynamic circulation)
- Neurological (hepatic encephalopathy)

Portal hypertension

Ascites

Oesophageal varices

Splenomegaly

■ Cutaneous

Spider naevi

Palmar erythema

Summary box 61.7

Management of liver trauma

- Remember associated injuries
- At-risk groups

Stabbing/gunshot in lower chest or upper abdomen

Crush injury with multiple rib fractures

Resuscitate

Airway

Breathing

Circulation

■ Assessment of injury

Spiral CT with contrast

Laparotomy if haemodynamically unstable

■ Treatment

Correct coagulopathy

Suture lacerations

Resect if major vascular injury

Packing if diffuse parenchymal injury

Summary box 61.8

Other complications of liver trauma

- Intrahepatic haematoma
- Liver abscess
- Bile collection
- Biliary fistula
- Hepatic artery aneurysm
- Arteriovenous fistula
- Arteriobiliary fistula
- Liver failure

Summary box 61.9

Management of bleeding oesophageal varices

- Blood transfusion
- Correct coagulopathy
- Oesophageal balloon tamponade (Sengstaken–Blakemore tube)
- Drug therapy (vasopressin/octreotide)
- Endoscopic sclerotherapy or banding
- Assess portal vein patency (Doppler ultrasound or CT)
- Transjugular intrahepatic portosystemic stent shunts (TIPSS)
- Surgery

Portosystemic shunts

Oesophageal transection

Splenectomy and gastric devascularisation

Summary box 61.10

Determining the cause of ascites

Imaging (ultrasound or CT)

- Irregular cirrhotic liver
- Portal vein patency
- Splenomegaly of cirrhosis Aspiration
- Culture and microscopy
- Protein content
- Cytology
- Amylase level

Summary box 61.11

Treatment of ascites in chronic liver disease

- Salt restriction
- Diuretics
- Abdominal paracentesis
- Peritoneovenous shunting
- TIPSS
- Liver transplantation

Summary box 61.12

Prognostic factors in patients undergoing resection

of colorectal liver metastases

- Stage of primary
- Time from primary resection
- Carcinoembryonic antigen (CEA) level

■ Size of largest lesion Number of lesions Summary box 61.13 Staging and assessment with colorectal liver metastases ■ General medical assessment ■ CT,PET-CT or MRI of the abdomen/pelvis with contrast (? resectability) ■ Chest CT ■ Review histology of primary (? risk of local recurrence) ■ Colonoscopy Liver function tests and tumour markers Summary box 61.14 Strategies for 'unresectable' colorectal liver metastases ■ Neoadjuvant oxaloplatinum/5-fluorouracil systemic chemotherapy ■ Anti-VEGF or EGFR monoclonal antibody therapy ■ Two-stage liver resection Portal vein embolisation **62.The spleen**

Summary box 62.1

Functions of the spleen

- Immune
- Filter function
- Pitting

- Reservoir
- Cytopoiesis
- Splenectomy harms the patient/

Summary box 62.2

Indications for splenectomy

Trauma

- Accidental
- Operative

Oncological

- Part of en bloc resection
- Diagnostic
- Therapeutic

Haematological

- Spherocytosis
- Purpura (ITP)
- Hypersplenism

Portal hypertension

Variceal surgery

Summary box 62.3

Splenectomy

- Remember preoperative immunisation
- Prophylactic antibiotics in the long term

■ OPSI is a real clinical danger

63.The gall bladder and bile ducts

Summary box 63.1

Investigation of the biliary tree

- Ultrasound:stones and biliary dilatation
- Plain radiograph:calcification
- Magnetic resonance cholangiopancreatography:anatomy and stones
- Multidetector row computerised tomography scan:

anatomy, liver, gall bladder and pancreas cancer

- Radioisotope scanning:function
- Endoscopic retrograde cholangiopancreatography:

anatomy, stones and biliary strictures

- Percutaneous transhepatic cholangiography:anatomy and biliary strictures
- Endoscopic ultrasound:anatomy and stones

Summary box 63.2

Natural history of gallstones

Asymptomatic

1-2% per year

0.2% per year

Biliary colic

Chronic

Cholecystitis

5% per year

acute cholecystitis

symptoms

Gall bladder carcinoma

0.08% symptomatic

Patients

Bile duct stone

-pancreatitis

-cholangitis

-jaundice

Summary box 63.3

Effects and complications of gallstones

In the gallbladder

- Biliary colic
- Acute cholecystitis
- Chronic cholecystitis
- Empyema of the gall bladder
- Mucocele
- Perforation

In the bile ducts

- Biliary obstruction
- Acute cholangitis
- Acute pancreatitis

In the intestine

■ Intestinal obstruction (gallstone ileus)

Summary box 63.4

Differential diagnosis of cholecystitis

Common

- Appendicitis
- Perforated peptic ulcer
- Acute pancreatitis

Uncommon

- Acute pyelonephritis
- Myocardial infarction
- Pneumonia right lower lobe

Ultrasound scan aids diagnosis

Uncertain diagnosis - do CT scan

Summary box 63.5

Preparation for operation

- Full blood count
- Renal profile and liver function tests
- Prothrombin time
- Chest X-ray and electrocardiogram (if over 45 years or medically indicated)
- Antibiotic prophylaxis
- Deep vein thrombosis prophylaxis
- Informed consent

Summary box 63.6

Post-cholecystectomy discomfort

- If there is a delay in recovery after cholecystectomy, exclude bile duct or bowel injury
- Incidence of bile duct injury is 0.05%

Indications for choledochotomy

- 1 palpable stones in the common bile duct;
- 2 jaundice, a history of jaundice or cholangitis;
- 3 a dilated common bile duct;
- 4 abnormal liver function tests, in particular a raised alkaline phosphatase.

Summary box 63.7

Causes of benign biliary stricture

Congenital

Biliary atresia

Bile duct injury at surgery

- Cholecystectomy
- Choledochotomy
- Gastrectomy
- Hepatic resection
- Transplantation

Inflammatory

- Stones
- Cholangitis
- Parasitic
- Pancreatitis
- Sclerosing cholangitis
- Radiotherapy

Trauma

Idiopathic

Summary box 63.8

Radiological investigation of biliary strictures

■ Ultrasonography

- Cholangiography via T-tube, if present
- ERCP
- MRCP

- PTC (see Figs 63.20 and 63.21,pp.1116 and 1117)
- Multidetector row CT

Summary box 63.9

Bile duct cancer

- Rare, but incidence increasing
- Presents with jaundice and weight loss
- Diagnosis by ultrasound and CT scanning
- Jaundice relieved by stenting
- Surgical excision possible in 5%
- Prognosis poor 90% mortality in 1 year

Summary box 63.10

Gall bladder cancer

- Rare
- Presents as for benign biliary disease (gallstones)
- Diagnosis by ultrasound and CT scanning
- Excision in less than 10% remainder palliative treatment
- Prognosis poor 95% mortality in 1 year

64.The pancreas

Summary box 64.1

Anomalies of the pancreas

- Aplasia
- Hypoplasia
- Hyperplasia
- Hypertrophy
- Dysplasia
- Variations and anomalies of the ductsa

Pancreas divisum

Rotational anomalies

- Annular pancreasa
- Pancreatic gall bladder
- Polycystic diseasea
- Congenital pancreatic cysts, cystic fibrosisa von Hippel–Lindau syndrome

- Ectopic pancreatic tissue, accessory pancreasa
- Vascular anomalies
- Choledochal cystsa
- Horseshoe pancreas

aThe more frequent anomalies encountered in surgical practice.

Summary box 64.2

Causes of raised serum amylase level other than

acute pancreatitis

- Mesenteric infarction
- Torsion of an intra-abdominal viscus
- Retroperitoneal haematoma
- Ectopic pregnancy
- Macroamylasaemia
- Renal failure
- Salivary gland inflammation

Table 64.2 Investigation of the pancreas

Serum enzyme levels

Pancreatic function tests

Morphology

Ultrasound scan

Computerised tomography

Magnetic resonance imaging

Endoscopic retrograde cholangiopancreatography

Endoscopic ultrasound

Plain radiography

Chest

Upper abdomen

Summary box 64.3

External injury to the pancreas

- Other organs are likely to be injured
- It is important to ascertain whether the pancreatic duct has been disrupted

■ CT and ERCP are the most useful tests • Surgery is indicated if the main pancreatic duct is disrupted Summary box 64.4 Management of pancreatic fistulae Tests ■ Measure amylase level in fluid ■ Determine the anatomy of the fistula • Check whether the main pancreatic duct is blocked or disrupted Measures ■ Correct fluid and electrolyte imbalances ■ Protect the skin ■ Drain adequately Parenteral or nasojejunal feeding Octreotide to suppress secretion ■ Relieve pancreatic duct obstruction if possible (ERCP and stent) ■ Treat underlying cause

Summary box 64.5

Possible causes of acute pancreatitis

- Gallstones
- Alcoholism
- Post ERCP
- Abdominal trauma
- Following biliary, upper gastrointestinal or cardiothoracic surgery

Ampullary tumour

- Drugs (corticosteroids,azathioprine,asparaginase,valproic acid,thiazides,oestrogens)
- Hyperparathyroidism
- Hypercalcaemia
- Pancreas divisum
- Autoimmune pancreatitis
- Hereditary pancreatitis
- Viral infections (mumps,coxsackie B)
- Malnutrition
- Scorpion bite
- Idiopathic

Summary box 64.6

Aetiology of acute pancreatitis

- It is essential to establish the aetiology
- Investigate thoroughly before labelling it as 'idiopathic'
- After the acute episode resolves, remember further management of the underlying aetiology
- If the aetiology is gallstones, cholecystectomy is desirable during the same admission

Summary box 64.7

Investigations in acute pancreatitis should be aimed at answering three questions:

- Is a diagnosis of acute pancreatitis correct?
- How severe is the attack?
- What is the aetiology?

Table 64.3 Scoring systems to predict the severity of acute pancreatitis: in both systems, disease is classified as severe when three or more factors are present Ranson score **On admission** Age > 55 years White blood cell count > $16 \ge 109 \text{ l}-1$ Blood glucose > 10 mmoll-1LDH > 700 units l-1 AST > 250 Sigma Frankel units per cent Within 48 hours Blood urea nitrogen rise > 5 mg%Arterial oxygen saturation (PaO2) < 8kPa (60mmHg) Serum calcium < 2.0mmol l–1 Base deficit > 4 mmoll-1Fluid sequestration >6 litres Table 64.4 Early management of severe acute pancreatitis Admission to HDU/ICU Analgesia Aggressive fluid rehydration Oxygenation Invasive monitoring of vital signs, central venous pressure, urine output, blood gases Frequent monitoring of haematological and biochemical parameters (including liver and renal function, clotting, serum calcium, blood glucose)

Nasogastric drainage

Antibiotic prophylaxis can be considered (imipenem, cefuroxime)

CT scan essential if organ failure, clinical deterioration or signs of sepsis develop

ERCP within 72 hours for severe gallstone pancreatitis or signs of cholangitis

Supportive therapy for organ failure if it develops (inotropes, ventilatory support, haemofiltration, etc.)

If nutritional support is required, consider enteral (nasogastric) feeding

CT, computerised tomography; ERCP, endoscopic retrograde cholangiopancreatography; HDU, high-dependency unit; ICU, intensive care unit.

Table 64.5 Complications of acute pancreatitis

Local
(Usually develop after the first
week)
Acute fluid collection
Sterile pancreatic necrosis
Infected pancreatic necrosis
Pancreatic abscess
Pseudocyst
Pancreatic ascites
Pleural effusion

	Visual disturbances		6		
	Confusion irritability				
_	Encephalonathy				
_	Miscellaneous				
	Suboutaneous fat neorosis				
	Arthrolaio				
	Artillargia				
	Table 64.6 Possible complications of a pancreatic pseudocyst				
	Process	Outcomes			
	Infection	Abscess			
_	Systemic	sensis			
	Bunture	500515			
	Into the gut	Gastrointestinal bleeding			
_	into the gut	Internal fistula			
_	Into the peritonoum	Deritonitis			
	Enlargement	remonitis			
	Emargement	Obstructive isoundies from hiliary			
	Pressure effects				
_		Compression Derived obstruction			
	Dain	Bower obstruction			
_		II			
	Erosion into a vessel	Haemorrhage into the cyst			
_		Haemoperitoneum			
	Summary box 64.8				
	Distinguishing a pseudocyst from a cystic neoplasm				
	■ History				
_	■ Appearance on CT and ul	trasound			
			1.12		

CEA (high level in mucinous tumours)

Amylase (level usually high in pseudocysts, but occasionally in tumours)

Cytology

Summary box 64.9

Medical treatment of chronic pancreatitis Treat the addiction

- Help the patient to stop alcohol consumption and tobacco smoking
- Involve a dependency counsellor or a psychologist Alleviate abdominal pain
- Eliminate obstructive factors (duodenum, bile duct, pancreatic duct)
- Escalate analgesia in a stepwise fashion
- Refer to a pain management specialist
- For intractable pain, consider CT/EUS-guided coeliac axis block Nutritional and digestive measures
- Diet:low in fat and high in protein and carbohydrates
- Pancreatic enzyme supplementation with meals
- Correct malabsorption of the fat-soluble vitamins (A,D,E,K) and vitamin B12
- Medium-chain triglycerides in patients with severe fat malabsorption (they are directly absorbed by the small intestine without the need for digestion)
- Reducing gastric secretions may help

Treat diabetes mellitus

Summary box 64.10

Palliation of pancreatic cancer

Relieve jaundice and treat biliary sepsis

- Surgical biliary bypass
- Stent placed at ERCP or percutaneous transhepatic

cholangiography

Improve gastric emptying

- Surgical gastroenterostomy
- Duodenal stent

Pain relief

- Stepwise escalation of analgesia
- Coeliac plexus block
- Transthoracic splanchnicectomy

Symptom relief and quality of life

- Encourage normal activities
- Enzyme replacement for steatorrhoea
- Treat diabetes

Consider chemotherapy

65.The small and large intestines

Summary box 65.1

Meckel's diverticulum

■ Occurs in 2% of patients, are usually 2 inches (5cm) in

length and are situated 2 feet (60cm) from the ileocaeca valve

- It should be sought when a normal appendix is found at surgery for suspected appendicitis
- If a silent Meckel's is found incidentally during the course

of an operation, it can be left alone provided it is wide mouthed and not thickened

■ If ectopic gastric epithelium is present within the

diverticulum, it may be the source of gastrointestinal bleeding
Complications of diverticular disease

- Diverticulitis
- Pericolic abscess
- Peritonitis
- Intestinal obstruction
- Haemorrhage
- Fistula formation

Summary box 65.3

Principles of surgical management of diverticular

disease

■ In elective cases with full bowel preparation, resection and

primary anastomosis is usually possible

■ If there is obstruction, oedema, adhesions or perforation,

Hartmann's procedure is usually the operation of choice

- In selected cases, resection and anastomosis after on-table lavage may be possible
- Laparoscopic assessment has been described but is controversial
- In cases of minimal peritoneal contamination, peritoneal

lavage followed by suture of a small perforation can also be performed

Summary box 65.4

Complications of UC

Acute

- Toxic dilatation
- Perforation

■ Haemorrhage

Chronic

- Cancer
- Extra-alimentary manifestations:skin lesions,eye

problems, liver disease

Barium enema

The principal signs are (Fig. 65.19):

- loss of haustration, especially in the distal colo
- mucosal changes caused by granularity;
- pseudopolyps;
- in chronic cases, a narrow contracted colon.

Colonoscopy and biopsy

This has an important place in management:

- 1 to establish the extent of inflammation;
- 2 to distinguish between UC and Crohn's colitis;
- 3 to monitor response to treatment;
- 4 to assess longstanding cases for malignant change.

Summary box 65.5

Principles of management of UC

- Many patients can be adequately maintained for years on medical therapy
- Toxic dilatation must be suspected in any colitic patient who develops severe abdominal pain; missed colonic perforation is associated with a high mortality

• Colitic patients are at increased risk of developing cancer;

those with pancolitis of long duration are most at risk

Indications for surgery

The risk of colectomy is 20% overall, ranging from 5% in those

patients with proctitis to 50% in those patients with a very severe

attack. The need for surgery is highest in the first year after the disease onset, for:

• severe or fulminating disease failing to respond to medical therapy;

• chronic disease with anaemia, frequent stools, urgency and tenesmus;

• steroid-dependent disease - here, the disease is not severe but

remission cannot be maintained without substantial doses of steroids;

• the risk of neoplastic change: patients who have severe dyspla- sia on review colonoscopy;

• extraintestinal manifestations;

• rarely, severe haemorrhage or stenosis causing obstruction.

Summary box 65.6

Principles of management of CD

■ Close liaison between physician and surgeon is crucial

Medical therapy should always be considered as an alternative to surgery, although surgery should not be delayed when a clear indication for surgery exists

Patients must be optimised as far as possible prior to

surgery, and this may require preoperative total parenteral nutrition

• CD is a chronic relapsing disease with a high likelihood of reoperation; the surgeon must take every reasonable effort to preserve bowel length and sphincter function

Indications for surgery

Surgical resection will not cure CD. Surgery is therefore focused

on the complications of the disease. As many of these indications

for surgery may be relative, joint management by an aggressive

physician and a conservative surgeon is thought to be ideal.

These complications include:

- recurrent intestinal obstruction;
- bleeding;
- perforation;
- failure of medical therapy;
- intestinal fistula;
- fulminant colitis;
- malignant change;
- perianal disease.

Summary box 65.7

Differences between UC and CD

■ UC affects the colon;CD can affect any part of the

gastrointestinal tract, but particularly the small and large bowel

- UC is a mucosal disease whereas CD affects the full thickness of the bowel wall
- UC produces confluent disease in the colon and rectum

whereas CD is characterised by skip lesions

- CD more commonly causes stricturing and fistulation
- Granulomas may be found on histology in CD but not in UC
- CD is often associated with perianal disease whereas this is unusual in UC
- CD affecting the terminal ileum may produce symptoms mimicking appendicitis, but this does not occur in UC
- Resection of the colon and rectum cures the patient with

UC, whereas recurrence is common after resection in CD

Table 65.3 Classification of polyps of the large intestineClassVarietiesInflammatoryInflammatory polypsMetaplasticMetaplastic or hyperplastic polypsHarmartomatousPeutz–Jeghers polypJuvenile polyp

Neoplastic

Adenoma

–Tubular

-Tubulovillous

-Villous

Adenocarcinoma

Carcinoid tumour

Summary box 65.8

FAP

- Autosomal dominant inherited disease due to mutation of the APC gene
- More than 100 colonic adenomas are diagnostic
- Surgery is the only means of preventing colonic cancer
- Polyps and malignant tumours can develop in the duodenum and small bowel

Figure 65.39 Distribution of colorectal cancer by site.

Hepatic flexure

2%

Splenic flexure

3%

0			0
	Transverse colon		
	5.5%		
	Transverse colon		
_	5.5%		
	Anus		
_	2%		
	Ascending		
_	colon		
	5%		
	Caecum		
_	12%		
	Appendix		
_	0.5%		
	Descending		
_	colon		
	4%		
_	Sigmoid colon		
_	21%		
_	Rectum		
	38%		
	Summary box 65.9		
_	Symptoms and signs of colorectal cancer		
	Right-sided tumours: iron deficiency anaemia, abdominal mass		
	■ Left-sided tumours:rectal bleeding,alteration in bowel habit,tenesmus,obstruction		
	 Metastatic disease:jaundice,ascites,hepatomegaly;other 		
		150	

symptoms and signs from rarer sites of metastasis

■ There may be considerable overlap between these Symptoms

Summary box 65.10

Principles of management of colorectal cancer

■ Assessment of local and distant tumour spread should be performed both preoperatively and intraoperatively to allow planning of surgery

■ Synchronous tumours occur in about 5% of patients and

should be excluded preoperatively

• Operations are planned to remove the primary tumour

and its draining locoregional lymph nodes

■ Histological examination of resected tumours contributes to decision making regarding the need for adjuvant therapy

Summary box 65.11

Stomas

- May be colostomy or ileostomy
- May be temporary or permanent
- Temporary or defunctioning stomas are usually fashioned as loop stomas
- An ileostomy is spouted; a colostomy is flush
- Ileostomy effluent is usually liquid whereas colostomy effluent is usually solid
- Ileostomy patients are more likely to develop fluid and electrolyte problems
- An ileostomy is usually sited in the right iliac fossa
- A temporary colostomy may be transverse and sited in the right upper quadrant
- End-colostomy is usually sited in the left iliac fossa
- All patients should be counselled by a stoma care nurse before operation
- Complications include skin irritation, prolapse, retraction,

necrosis, stenosis, parastomal hernia, bleeding and fistulation

Complications of colostomies

The following complications can occur to any colostomy but are

more common after poor technique or siting of the stoma:

- prolapse;
- retraction;
- necrosis of the distal end;
- fistula formation;
- stenosis of the orifice;
- colostomy hernia;
- bleeding (usually from granulomas around the margin of the colostomy);

• colostomy 'diarrhoea': this is usually an infective enteritis and will respond to oral metronidazole 200 mg three times daily.

66.Intestinal obstruction

Summary box 66.1

Causes of intestinal obstruction

Dynamic

Intraluminal

Impaction

Foreign bodies

Bezoars

Gallstones

Intramural

Stricture

Malignancy

■ Extramural

Bands/adhesions

Hernia

Volvulus

Intussusception

Adynamic

- Paralytic ileus
- Mesenteric vascular occlusion
- Pseudo-obstruct

Summary box 66.2

Mechanisms of obstruction

- Volvulus
- Incarceration
- Obstruction
- Intussusception

The common causes of dynamic intes- tinal obstruction and their relative frequencies.

Adhesions

40%

Miscellaneous

5%

Pseudo-obstruction

5%

Faecal impaction

8%

Carcinoma

15%

Inflammatory

15%

Obstructed hernia

12%

Summary box 66.3

Causes of strangulation

External

- Hernial orifices
- Adhesions/bands

Interrupted blood flow

- Volvulus
- Intussusception

Increased intraluminal pressure

■ Closed-loop obstruction

Primary

Mesenteric infarction

Summary box 66.4

Prevention of adhesions

Factors that may limit adhesion formation include:

- Good surgical technique
- Washing of the peritoneal cavity with saline to remove clots,etc.

- Minimising contact with gauze
- Covering anastomosis and raw peritoneal surfaces

Intussusception

- Most common in children
- Primary or secondary to intestinal pathology,e.g.polyp, Meckel's diverticulum
- Ileocolic is the commonest variety
- Can lead to an ischaemic segment
- Radiological reduction is indicated in most cases
- The remainder require surgery

Summary box 66.6

Volvulus

■ May involve the small intestine, caecum or sigmoid colon;

neonatal midgut volvulus secondary to midgut malrotation is life-threatening

- The commonest spontaneous type in adults is sigmoid
- Sigmoid volvulus can be relieved by decompression peranum
- Surgery is required to prevent or relieve ischaemia

Summary box 66.7

Features of obstruction

■ In high small bowel obstruction, vomiting occurs early and is profuse with rapid dehydration. Distension is minimal with little evidence of fluid levels on abdominal radiography

■ In low small bowel obstruction, pain is predominant with

central distension. Vomiting is delayed. Multiple central fluid levels are seen on radiography

■ In large bowel obstruction, distension is early and

pronounced.Pain is mild and vomiting and dehydration

are late. The proximal colon and caecum are distended on abdominal radiography

Cardinal clinical features of acute obstruction

- Abdominal pain
- Distension
- Vomiting
- Absolute constipation

Summary box 66.9

Clinical features of strangulation

- Constant pain
- Tenderness with rigidity
- Shock

Summary box 66.10

Radiological features of obstruction

■ The obstructed small bowel is characterised by straight

segments that are generally central and lie transversely.No gas is seen in the colon

■ The jejunum is characterised by its valvulae conniventes, which completely pass across the width of the bowel and are regularly spaced, giving a 'concertina' or ladder effect

■ Ileum – the distal ileum has been piquantly described by Wangensteen as featureless

■ Caecum – a distended caecum is shown by a rounded gas shadow in the right iliac fossa

■ Large bowel,except for the caecum,shows haustral folds, which,unlike valvulae conniventes, are spaced irregularly, do not cross the whole diameter of the bowel and do not have indentations placed opposite one another

Summary box 66.11

Treatment of acute intestinal obstruction

■ Gastrointestinal drainage

0							
	Fluid and electrolyte replacement						
	■ Relief of obstruction						
	Surgical treatment is necessary for most cases of in delayed until resuscitation is complete, provided ther	ntestinal obstruction but should be e is no sign of strangulation or					
	evidence of closed-loop obstruction						
	Summary box 66.12						
_	Principles of surgical intervention for obstruction						
	Management of:						
_	■ The segment at the site of obstruction						
	■ The distended proximal bowel						
	■ The underlying cause of obstruction						
Summary box 66.13							
	Indications for early surgical intervention						
_	 Obstructed or strangulated external hernia 						
	Internal intestinal strangulation						
	■ Acute obstruction						
	Table 66.3 Differentiation between viable and non-viable intestine						
	Viable	Non-viable					
	Circulation Dark colour becomes lighter	Dark colour remains					
	Mesentery bleeds if pricked	No bleeding if mesentery is pricked					
	Peritoneum Shiny	Dull and lustreless					
	Intestinal musculature Firm	Flabby, thin and friable					
	Pressure rings may or may not disappear	Pressure rings persist					
	Peristalsis may be observed	No peristalsis					
_		157					

Ō

Treatment of adhesive obstruction

■ Initially treat conservatively provided there are no signs of

strangulation; should rarely continue conservative treatment for longer than 72 hours

- At operation, divide only the causative adhesion(s) and limit dissection
- Cover serosal tears; invaginate (or resect) areas of doubtful viability
- Laparoscopic adhesiolysis may have a role in chronic cases

Summary box 66.15

Management of left-sided large bowel obstruction

Contraindications to immediate resection include:

- Inexperienced surgeon
- Moribund patient
- Advanced disease

Summary box 66.16

Principles of investigation of possible large bowel obstruction

■ In the presence of large bowel obstruction, a single-

contrast water-soluble enema or CT should be undertaken to exclude a functional cause

Summary box 66.17

Factors associated with pseudo-obstruction

Idiopathic

Metabolic

Diabetes:intermittent porphyria

Acute hypokalaemia

Uraemia

Myxodoema

■ Severe trauma (especially to the lumbar spine and pelvis)

■ Shock

Burns

Myocardial infarction

Stroke

Septicaemia

Retroperitoneal irritation

Blood

Urine

Enzymes (pancreatitis)

Tumour

Drugs

Tricyclic antidepressants

Phenothiazines

Laxatives

Secondary gastrointestinal involvement

Scleroderma

Chagas' disease

67.The vermiform appendix

Summary box 67.1

Risk factors for perforation of the appendix

- Extremes of age
- Immunosuppression
- Diabetes mellitus
- Faecolith obstruction
- Pelvic appendix
- Previous abdominal surgery

Summary box 67.2

Symptoms of appendicitis

- Peri-umbilical colic
- Pain shifts to the right iliac fossa
- Anorexia
- Nausea

Summary box 67.3

Clinical signs in appendicitis

- Pyrexia
- Localised tenderness in the right iliac fossa

- Muscle guarding
- Rebound tenderness

Summary box 67.4

Signs to elicit in appendicitis

Pointing sign

- Rovsing's sign
- Psoas sign
- Obturator sign

Table 67.1 Differential diagnosis of acute appendicitis

Children	Adult	Adult female	Elderly
Gastroenteritis	Regional enteritis	Mittelschmerz	Diverticulitis
Mesenteric adenitis	Ureteric colic	Pelvic inflammatory disea	se Intestinal obstruction
Meckel's diverticulitis	Perforated peptic ulcer	Pyelonephritis	Colonic carcinoma
Intussusception	Torsion of testis	Ectopic pregnancy T	orsion appendix epiploicae
Henoch–Schönlein purpura	Pancreatitis	Torsion/rupture of	Mesenteric infarction
		ovarian cyst	
Lobar pneumonia	Rectus sheath haematoma	Endometriosis	Leaking aortic aneurysm

Table 67.2 The Alvarado (MANTRELS) score

Symptoms	Score			
Migratory RIF pain	1			
Anorexia	1			
Nausea and vomiting	1			
Signs				
Tenderness (RIF)	2			
Rebound tenderness	1			
Elevated temperature	1			
Laboratory				
Leucocytosis	2			
Shift to left	1			

Total 10

RIF, right iliac fossa; MANTRELS, Migration of pain, Anorexia, Nausea or vomit-

ing, Tenderness, Rebound pain, Elevation of temperature, Leucocytosis, Shift to left (segmented neutrophils). A score of 7 or more is strongly predictive of acute appendicitis

In patients with an equivocal score (5–6)

Summary box 67.5

Preoperative investigations in appendicitis

Routine

- Full blood count
- Urinalysis

Selective

- Pregnancy test
- Urea and electrolytes
- Supine abdominal radiograph
- Ultrasound of the abdomen/pelvis
- Contrast-enhanced CT scan of the abdomen

*Transverse or skin crease (Lanz) incision for appendicitis, 2cm below the umbilicus, centred on the mid-clavicularmidinguinal line

Summary box 67.7

Check-list for unwell patient following

appendicectomy

- Examine the wound and abdomen for an abscess
- Consider a pelvic abscess and perform a rectal examination

■ Examine the lungs – pneumonitis or collapse

- Examine the legs consider venous thrombosis
- Examine the conjunctivae for an icteric tinge and the liver

for enlargement, and enquire whether the patient has had rigors (pylephlebitis)

- Examine the urine for organisms (pyelonephritis)
- Suspect subphrenic abscess

Summary box 67.6

Criteria for stopping conservative treatment of an

appendix mass

- A rising pulse rate
- Increasing or spreading abdominal pain
- Increasing size of the mass

68.The rectum

Summary box 68.1

Anatomy of the rectum

- The rectum measures approximately 15cm in length
- It is divided into lower, middle and upper thirds
- The blood supply consists of inferior, middle and superior rectal vessels
- Although the lymphatic drainage follows the blood supply,

the principal route is upwards along the superior rectal

vessels to the para-aortic nodes

Summary box 68.2

Main symptoms of rectal disease

Bleeding per rectum

- Altered bowel habit
- Mucus discharge
- Tenesmus
- Prolapse

Examination of the rectum

- Visual inspection of the perineum
- Digital examination
- Proctoscopy
- Sigmoidoscopy rigid or flexible

Summary box 68.4

Injuries to the rectum are serious and invariably require surgery

- A temporary colostomy is often necessary
- There is a serious risk of associated necrotising fasciitis,

and broad-spectrum antibiotics are mandatory

■ There may be associated bladder or urethral damage

Summary box 68.5

Rectal prolapse

- It may be mucosal or full thickness
- If full thickness, the whole wall of the rectum is included
- It commences as a rectal intussusception

- In children, the prolapse is usually mucosal and should be treated conservatively
- In the adult, the prolapse is often full thickness and is frequently associated with incontinence

- Surgery is necessary for full-thickness rectal prolapse
 The operation is performed either via the perineum or via the abdomen
 Summary box 68.6
 Proctitis
 - May be non-specific or related to a specific infective agent
 - Non-specific proctitis usually remains confined to the distal bowel, but can spread to the proximal colon
 - Causes bleeding, diarrhoea and tenesmus
 - Treatment is usually conservative

Polyps in the rectum

- Are either single or multiple
- Adenomas are the most frequent histological type
- Villous adenomas may be extensive and undergo

malignant change more commonly than tubular adenomas

- All adenomas must be removed to avoid carcinomatous change
- All patients must undergo colonoscopy to determine whether further polyps are present

Most polyps can be removed by endoscopic techniques, but sometimes major surgery is required

Summary box 68.8

Pathology and staging of rectal cancer

- Tumours are adenocarcinomas and are well, moderately or poorly differentiated
- They spread by local,lymphatic,venous and transperitoneal routes
- Circumferential local spread is the most important as this profoundly affects surgical treatment

■ Although lymphatic spread follows the blood supply of the rectum, most occurs in an upwards direction via the superior rectal vessels to the para-aortic nodes

• The TNM classification is the internationally recognized staging system

Summary box 68.9

Early symptoms of rectal cancer

- Bleeding per rectum
- Tenesmus
- Early morning diarrhea

Summary box 68.10

Diagnosis and assessment of rectal cancer

All patients with suspected rectal cancer should undergo:

- Digital rectal examination
- Sigmoidoscopy and biopsy
- Colonoscopy if possible (or CT colonography or barium enema)

All patients with proven rectal cancer require staging by:

- Imaging of the liver and chest, preferably by CT
- Local pelvic imaging by magnetic resonance imaging and/or endoluminal ultrasound

Summary box 68.11

Preoperative preparation

- Mechanical bowel preparation
- Counselling and siting of stomas
- Correction of anaemia and electrolyte disturbance

- Cross-matching of blood
- Prophylactic antibiotics

- Deep vein thrombosis prophylaxis
- Insertion of urethral catheter

Surgery for rectal cancer

- Surgery is the mainstay of curative therapy
- The primary resection consists of rectal excision with TME

■ Most cases can be treated by anterior resection with the

colorectal anastomosis being achieved with a circular stapling gun

■ A smaller group of low, extensive tumours require an

abdominoperineal excision with a permanent colostomy

- Preoperative radiotherapy can reduce local recurrence
- Adjuvant chemotherapy can improve survival in node- positive disease
- Liver resection in carefully selected patients offers the best

chance of cure for single or well-localised liver metastases

69.The anus and anal canal

Summary box 69.1

Anal canal anatomy

The internal sphincter is composed of circular, non-striated

involuntary muscle supplied by autonomic nerves

- The external sphincter is composed of striated voluntary muscle supplied by the pudendal nerve
- Extensions from the longitudinal muscle layer support the sphincter complex
- The space between sphincters is known as the intersphincteric plane
- The superior part of the external sphincter fuses with the

puborectalis muscle, which is essential for maintaining the anorectal angle, necessary for continence ■ The lower part of the anal canal is lined by sensitive squamous epithelium ■ Blood supply to the anal canal is via superior, middle and inferior rectal vessels • Lymphatic drainage of the lower half of the anal canal goes to inguinal lymph nodes Summary box 69.2 Examination of anal canal ■ A rectal examination is essential for any patient with anorectal and/or bowel symptoms – 'If you don't put your finger in, you might put your foot in it' • A proctosigmoidoscopy is essential in any patient with bowel symptoms, and particularly if there is rectal bleeding Summary box 69.3 Imperforate anus ■ A rare congenital disorder ■ Classified as being high or low depending on the site of the rectal termination in relation to the pelvic floor ■ Low defects:relatively easy to correct but prone to constipation ■ High defects:more difficult to correct and prone to faecal incontinence Summary box 69.4 Causes of anal incontinence Congenital/childhood ■ Anorectal anomalies

- Spina bifida
- Hirschsprung's disease

Behavioural

Acquired/adulthood

- Diabetes mellitus
- Cerebrovascular accident
- Parkinson's disease
- Multiple sclerosis
- Spinal cord injury
- Other neurological conditions:

Myotonic dystrophy

Shy–Drager syndrome

Amyloid neuropathy

- Gastrointestinal infection
- Irritable bowel syndrome
- Metabolic bowel disease
- Inflammatory bowel disease
- Megacolon/megarectum
- Anal trauma
- Abdominal surgery:

Small bowel resection

Colonic resection

■ Pelvic surgery:

Hysterectomy

Rectal excision

- Pelvic malignancy
- Pelvic radiotherapy

Rectal prolapse

Mechanical, e.g. rectocoele, intussusceptio

Functional, i.e. pelvic floor dyssynergia

■ Anal surgery:

Haemorrhoidectomy

Surgery for fistula

Surgery for fissure

Rectal disimpaction

Obstetric events

General

- Ageing
- Dependence of nursing care
- Obesity
- Psycho-behavioural factors
- Intellectual incapacity
- Drugs:

Primary constipating and laxative agents Secondary effects

Summary box 69.5

Anal fissure

- Acute or chronic
- Ischaemic ulcer in the midline of the anal canal

- Ectopic site suggests a more sinister cause
 Symptoms:
- Pain on defaecation
- Bright-red bleeding

- Mucous discharge
- Constipation

Treatment of an anal fissure

• Conservative initially, consisting of stool-bulking agents and softeners, and chemical agents in the form of ointments designed to relax the anal sphincter and improve blood flow

■ Surgery if above fails, consisting of lateral internal sphincterotomy or anal advancement flap

Summary box 69.7

Haemorrhoids: clinical features

- Haemorrhoids or piles are symptomatic anal cushions
- They are more common when intra-abdominal pressure is

raised,e.g.in obesity, constipation and pregnancy

■ Classically, they occur in the 3,7 and 11 o'clock positions

with the patient in the lithotomy position

- Symptoms of haemorrhoids:
- -bright-red, painless bleeding
- -mucus discharge
- -prolapse
- -pain only on prolapsed

Summary box 69.8

Four degrees of haemorrhoids

- First degree bleed only,no prolapse
- Second degree prolapse but reduce spontaneously
- Third degree prolapse and have to be manually reduced
- Fourth degree permanently prolapsed

Complications of haemorrhoids

- Strangulation and thrombosis (Fig.69.27)
- Ulceration
- Gangrene
- Portal pyaemia
- Fibrosis

Summary box 69.10

Treatment of haemorrhoids

■ Symptomatic – advice about defaecatory habits, stool softeners and bulking agents

- Injection of sclerosant
- Banding
- Haemorrhoidectomy

Summary box 69.11

Complications of haemorrhoidectomy Early

- Pain
- Acute retention of urine
- Reactionary haemorrhage Late
- Secondary haemorrhage
- Anal stricture
- Anal fissure
- Incontinence

Pruritus ani

- Common
- Numerous causes including skin diseases, parasites (threadworm), anal discharge, allergies, diabetes
- Treat the cause if possible
- Symptomatic treatment is the mainstay

Summary box 69.13

Anorectal abscess

■ Usually produces a painful,throbbing swelling in the anal

region. The patient often has swinging pyrexia

■ Subdivided according to anatomical site into perianal,

ischiorectal, submucous and pelvirectal

■ Underlying conditions include fistula-in-ano (most

common), Crohn's disesase, diabetes, immunosuppression

- Treatment is drainage of pus in first instance,together with appropriate antibiotics
- Always look for a potential underlying problem

Summary box 69.14

Anorectal fistulae

- Are common and may be simple or complex
- Are classified according to their relationship to the anal sphincters
- May be associated with underlying disease such as tuberculosis or Crohn's disease

■ Laying open is the surest method of eradication, but sphincter division may result in incontinence

Benign anal stricture

- May be spasmodic or organic
- May be iatrogenic, e.g. after haemorrhoidectomy or repair of imperforate anus
- Biopsy must be taken to rule out malignancy
- Can usually be managed by regular dilatation

Summary box 69.16

Anal cancer

- Uncommon tumour, which is usually a squamous cell carcinoma
- Associated with HPV
- More prevalent in patients with HIV infection
- May affect the anal verge or anal canal
- Lymphatic spread is to the inguinal lymph nodes
- Treatment is by chemoradiotherapy in the first instance
- Major ablative surgery is required if the above fails

PART 12: Genitourinary 70.Urinary symptoms and investigations

Summary box 70.1

Haematuria

- Is always abnormal whether microscopic or macroscopic
- May be caused by a lesion anywhere in the urinary tract
- Is investigated by:
- -examination of midstream specimen for infection
- -cytological examination of a urine specimen
- -intravenous urogram and/or urinary tract ultrasound scan -flexible or rigid cystoscopy
- Is commonly caused by urinary infection, especially in young women

Summary box 70.2

Pain from the upper urinary tract

• When caused by acute obstruction of the renal pelvis, is

typically fixed deep in the loin and 'bursting'in character

- When caused by acute ureteric obstruction (usually by a
- stone), is colicky with sharp exacerbations against a constant background
- Is liable to be referred to the groin,scrotum or labium as

calculus obstruction moves distally in the ureter

Summary box 70.3

Pain from the lower urinary tract

■ Is commonly felt as subrapubic discomfort, worsening as the bladder fills

• When caused by cystitis, typically has a burning or scalding

character felt in the urethra on micturition

■ May be referred to the tip of the penis in men, even when lesion is in the bladder

Summary box 70.4

Altered bladder function

■ Failure of the storage function of the bladder leads to

urgency and frequency of micturition, often by day and by night

■ Failure of the emptying function of the bladder is most

commonly caused by obstruction to the bladder outflow

(e.g.by prostatic enlargement) but can also be caused by weakness of the detrusor muscle

■ Chronic retention of urine may present as nocturnal bedwetting

Summary box 70.5

Microscopic, cytological, bacteriological and

biochemical examination of urine

Abnormalities found on Multistik testing of the urine

should be confirmed by microscopy and culture

The presence of greater than 105 organisms per ml of urine is deemed to indicate the presence of a significant urinary infection

• Cytological examination of the urine is likely to be

abnormal when there is a poorly differentiated transitional cell tumour in the bladder

Summary box 70.6

Tests of renal function

Elevated blood urea and serum creatinine levels usually

indicate a significant impairment of renal function

■ More sophisticated renal assessment is required to quantify the functional deficit

Summary box 70.7

Straight abdominal radiograph

- Most urinary calculi are radiodense
- Uric acid calculi are typically radiolucent

Summary box 70.8

Intravenous urography

■ IVU can cause a dangerous hypersensitivity reaction in a small number of patients

Summary box 70.9

Ultrasonography

Ultrasound scanning provides broadly similar anatomical

information to an intravenous urogram but without the risks

Summary box 70.10

Diagnostic examination

Diagnostic examination of the bladder is performed

painlessly under local anaesthesia using a flexible cystoscope

Summary box 70.11

Diagnosing anuria

- Check that the bladder is empty before diagnosing anuria
- Ultrasound the bladder

Summary box 70.13

Life-threatening hyperkalaemia

■ In acute renal failure, significant hyperkalaemia is life-threatening and should be corrected at an early stage

Summary box 70.14

Catheterisation and stents

- Urethral or suprapubic catheterisation will relieve obstruction distal to the bladder
- Indwelling stents to relieve ureteric obstruction can be inserted cystoscopically or percutaneously

71.The kidneys and ureters

Summary box 71.1

Absence of one kidney

- About 1:1400 people has an absent kidney
- It is usually symptomless and often discovered by accident
- When planning a nephrectomy the surgeon should

consider the possibility that the other kidney is congenitally absent

Summary box 71.2

Horseshoe kidneys

- Horseshoe kidneys are liable to pelviureteric obstruction, infection and stone formation
- If not recognised, a pelvic kidney may cause diagnostic confusion during surgery

Summary box 71.3

Polycystic kidney disease

- Inherited as an autosomal dominant trait
- An important cause of end-stage renal failure in adults
- Pain, haematuria, infection and hypertension are common
- Liable to be fatal in early middle age

Summary box 71.4

Simple renal cysts

- Common
- Often multiple
- Diagnosed on ultrasound
- Rarely require treatment
- Treat only if causing obstruction

Summary box 71.5

Duplication of the kidneys and ureters

- Is relatively common and often asymptomatic and harmless
- One or both moieties of the duplex may be dysplastic
- Abnormalities of the insertion of the ureter into the

bladder may cause urinary reflux, incontinence or obstruction

Haemorrhage

■ Life-threatening haemorrhage is a serious risk in closed or open trauma to the kidney

Summary box 71.7

Clinical features of closed renal trauma

■ There may be no external bruising

■ Haematuria indicates that the kidney has been damaged

and should prompt careful monitoring of vital signs and urgent investigation

Delayed haemorrhage may occur days after injury

Summary box 71.8

Surgical treatment in closed renal trauma

• Exploration of the kidney may be associated with massive

blood loss as the haematoma is opened

• Nephrectomy is a possibility so it is important to establish

that the contralateral kidney is functioning

Summary box 71.9

Ureteric injury during operation

■ The most common cause of injury to the ureters is surgical trauma during hysterectomy or other pelvic surgery

Preoperative catheterisation of the ureters makes them easier to protect during surgery

■ Injuries discovered at the time of surgery should be repaired immediately
Repair of the injured ureter

When surgical damage to a ureter is discovered postoperatively:

■ Repair need not be delayed if the patient is fit

A variety of techniques may be needed to ensure

successful repair, and surgery should be performed by a urologist

Summary box 71.11

Causes of unilateral ureteric obstruction

Extramural obstruction

■ Tumour from adjacent structures,e.g.carcinoma of the cervix,prostate,rectum,colon or caecum

- Idiopathic retroperitoneal fibrosis
- Retrocaval ureter

Intramural obstruction

Congenital stenosis, physiological narrowing of the

pelviureteric junction leading to pelviureteric junction obstruction

- Ureterocele and congenital small ureteric orifice
- Inflammatory stricture following removal of ureteric

calculus, repair of a damaged ureter or tuberculous infection

■ Neoplasm of the ureter or bladder cancer involving the ureteric orifice

Intraluminal obstruction

- Calculus in the pelvis or ureter
- Sloughed papilla in papillary necrosis (especially in

diabetics, analgesic abusers and those with sickle cell disease) may obstruct the ureter

Summary box 71.12 Idiopathic pelviureteric obstruction ■ May be asymptomatic ■ May be present as intermittent loin pain exacerbated by a fluid load Summary box 71.13 Ureteric dilatation in pregnancy Physiological dilatation of the ureter is common in pregnancy Summary box 71.14 Imaging • Obstruction of the ureter is diagnosed by a combination of ultrasound scanning and isotope renography • An obstructed kidney is worth preserving if the isotope renogram shows that it is contributing more than 20% of total renal function Summary box 71.15 **Renal** stones ■ Are common ■ May be clinically silent even when large • Are usually visible on a plain abdominal radiograph ■ May be radiolucent when composed of uric acid

Summary box 71.16

Ureteric colic

■ There is a pattern of severe exacerbation on a background of continuing pain

- Radiates to the groin, penis, scrotum or labium as the stone progresses down the ureter
- The severity of pain is not related to the size of the stone
- The pain is almost invariably associated with haematuria
- There may be few physical signs

Opacities on a plain abdominal radiograph that may be confused with renal calculus

- Calcified mesenteric lymph node
- Gallstones or concretion in the appendix
- Tablets or foreign bodies in the alimentary canal [e.g.cyclopenthiazide (Navidrex-K)]
- Phleboliths calcification in the walls of veins, especially in the pelvis
- Ossified tip of the 12th rib
- Calcified tuberculous lesion in the kidney
- Calcified adrenal gland

Summary box 71.18

Management of small stones

- Most small urinary calculi will pass spontaneously and can be treated conservatively
- The presence of infection in an upper urinary tract

obstructed by stone is dangerous and is an indication for urgent surgical intervention

Summary box 71.19

Kidney stone removal

■ Most urinary calculi can be treated by minimal access techniques

Recurrent stone formation

- Calculus formation is more common in those who have had a previous urinary stone
- Unless calculi are caused by a specific biochemical

abnormality, high fluid intake is the best way to discourage recurrent stone formation

Summary box 71.21

Indications for surgical removal of a ureteric calculus

- Repeated attacks of pain and the stone is not moving
- Stone is enlarging
- Complete obstruction of the kidney
- Urine is infected
- Stone is too large to pass
- Stone is obstructing solitary kidney or there is bilateral obstruction

Summary box 71.22

Kidney infection

■ Acute pyelonephritis:

In childhood

In pregnacy

With urinary obstruction

Chronic pyelonephritis:

Reflux nephropathy

- Pyonephrosis
- Renal abscess
- Perinephric abscess

Clinical features of kidney infections

- More common in women
- Often associated with septicaemia leading to pyrexia and rigors
- Associated with pyuria and occasionally haematuria
- Should be initially treated with broad-spectrum parenteral antibiotics
- Extremely dangerous if the kidney is obstructed

Summary box 71.24

Urinary infection in childhood

A single proven urinary infection in a child should prompt referral to a paediatric urologist

Summary box 71.25

Chronic pyelonephritis

- A common cause of end-stage renal failure
- Often associated with ureteric reflux
- May be symptomatically silent
- Leads to progressive renal scarring

Summary box 71.26

Management of perinephric abscess

• Collections of pus in or around the kidney should be

drained surgically if they cannot be aspirated by percutaneous needling

Renal tuberculosis

- Should be considered when symptoms of cystitis continue despite treatment with antibiotics
- Is a cause of 'sterile pyuria'
- Results in chronic inflammation and scarring throughout

the urinary tract, which may continue afteranti- tuberculous treatment has been instituted

■ May cause obstructive lesions throughout the urinary tract

Summary box 71.28

Renal neoplasms

Benign neoplasms

- Adenoma
- Angioma
- Angiomyolipoma Malignant neoplasms
- Wilms'tumour (nephroblastoma in children)
- Grawitz's tumour (adenocarcinoma, hypernephroma)
- Transitional cell carcinoma of the renal pelvis and collecting system
- Squamous carcinoma of the renal pelvis

Summary box 71.29

Nephroblastoma (Wilms'tumour)

- Usually presents in the first 5 years of life
- Typically presents with an abdominal mass
- May cause haematuria,abdominal pain or fever
- Metastasises to the lung
- Is best treated in a specialist paediatric oncology unit

Adenocarcinoma of the kidney

- Often presents with haematuria
- May be associated with pyrexia of unknown origin, polycythaemia, hypercalcaemia, anaemia and other paraneoplastic symptoms
- Metastasises via the bloodstream to bone, liver and lung (cannonball secondaries)
- Renal vein extension may embolise to the pulmonary circulation during nephrectomy

72.The urinary bladder

Summary box 72.1

Bladder trauma

- Intraperitoneal or extraperitoneal
- Suspected if there is trauma and damage to the pelvis
- May be diagnosed by retrograde cystography

Summary box 72.2

Management of bladder trauma

- Extravesical injury catheter drainage for 10 days
- Intraperitoneal injury laparotomy, repair and bladder drainage

Summary box 72.3

The most frequent causes of acute retention

Male

- Bladder outlet obstruction (the commonest cause)
- Urethral stricture
- Acute urethritis or prostatitis

Phimosis

Female

- Retroverted gravid uterus
- Bladder neck obstruction (rare)

Both

- Blood clot
- Urethral calculus
- Rupture of the urethra
- Neurogenic (injury or disease of the spinal cord)
- Smooth muscle cell dysfunction associated with ageing
- Faecal impaction
- Anal pain (haemorrhoidectomy)
- Intensive postoperative analgesic treatment
- Some drugs
- Spinal anaesthesia

Summary box 72.4

Catheterisation for acute retention of urine Following catheterisation:

- Record the volume of urine drained
- Examine the abdomen to exclude other pathology (rupture

of an aortic aneurysm, ureteric colic or diverticulitis can cause confusion)

Summary box 72.5

Clinical management of spinal injury

■ The bladder should be emptied during spinal shock by catheterisation

■ Encourage high fluid intake

Commence intermittent catheterisation • When the patient is stable undertake full urodynamic evaluation Summary box 72.6 Diagnosis of urinary incontinence The following investigations are required: • A careful history and physical examination and completion of frequency voiding charts • Urodynamic testing in most patients and in all patients in whom surgical intervention is proposed ■ Urine culture to exclude infection and measurement of serum creatinine In selected cases IVU is carried out if a ureteric fistula is suspected, although ultrasound examination will often provide adequate details Summary box 72.7 Uses of urodynamic testing ■ To distinguish GSI (due to sphincter weakness) from detrusor instability in women ■ For the classification of neurogenic bladder dysfunction • To distinguish bladder outflow obstruction from idiopathic detrusor instability in men • To investigate incontinence or other lower urinary tract symptoms Summary box 72.8 Bladder diverticula

Bladder diverticula are most frequently diagnosed

incidentally by cystoscopy or urinary tract imaging

■ The presence of a diverticulum – even quite a large one –

is not an indication for diverticulectomy unless symptoms or cancer are present

Fistulae

A fistula is a communication between two epithelium- lined surfaces

■ Most urinary fistulae are vesicovaginal and result from

obstetric trauma; an associated ureterovaginal fistulae occurs in about 10% of cases

■ A 'three-swab test' is used to aid the diagnosis. An examination under anaesthesia, vaginoscopy, and cystoscopy and IVU should be performed and, if necessary,

retrograde ureterography

• Conservative management is rarely successful

■ The principles of repair include good exposure, excision of diseased tissue and tension-free vascularised repair in anatomic layers

■ Fistulae caused by radiation, cancer and sepsis can be complex with multiple tracts

■ The persistence of a fistula on the skin implies the presence of distal obstruction, chronic infection, such as tuberculosis, or a foreign body, such as a stone or non-absorbable ligature

Summary box 72.10

UTI in adults

■ Isolated UTI in adults is not infrequent and is more common in women

Recurrent or complicated infection (haematuria, rigors) warrants appropriate antimicrobial therapy and investigation

Investigation to exclude a predisposing cause includes

urinalysis, microscopy and culture, upper tract imaging and cystoscopy

■ Mycobacterium tuberculosis, Neisseria gonorrhoeae or

Mycoplasma genitalium should be suspected if pus cells are present but urine culture is negative

■ Cancer, especially CIS, masquerading as infection may be diagnosed as abacterial cystitis

Urothelial cell carcinoma of the bladder

- The fourth most common non-dermatological malignancy in men (male–female ratio 3:1)
- Strongly associated with smoking and chemical exposure in western societies
- Strongly associated with Schistosoma haematobium

infection (bilharzial bladder cancer) in regions where the parasite is endemic

Reducing in incidence in countries where smoking is decreasing

Summary box 72.12

Bladder cancer staging

■ Cystoscopy and resection of tumour with separate resection of the tumour base is essential for accurate analysis of invasion into detrusor muscle

Bimanual examination should be performed after resection of the tumour

■ Upper tract imaging by IVU is essential.CT to stage invasive disease for lymph node metastasis is preferred

Summary box 72.13

Superficial bladder cancer

- Does not invade the detrusor muscle but can extend to the lamina propria
- Extension to the lamina propria (pT1) is a significant risk factor for progression to invasive disease,especially if associated with high-grade disease and CIS
- The incidence of recurrence of this disease can be reduced by intravesical chemotherapy and immunotherapy
- High-risk superficial disease (any grade 3 disease) is best

managed by BCG immunotherapy followed by radical treatment if disease persists

Invasive bladder cancer

■ Invasive bladder cancer should be staged by an accurate bimanual examination performed under anaesthesia before and after resection of the tumour

• CT or magnetic resonance imaging should be performed to identify lymph node involvement and distant spread

■ Radical therapy in the form of radical cystectomy and

thorough lymph node dissection is the primary treatment

- Neoadjuvant cisplatin-based chemotherapy improves survival rates
- External beam radiotherapy is an option for patients who

are unfit for, or who decline, cystectomy

■ Locally advanced disease may be downstaged by

radiotherapy or chemotherapy to enable salvage cystectomy

73. The prostate and seminal vesicles

Summary box 73.1

Androgenic hormones

- Androgenic hormones, which drive prostate growth, are derived from several sources
- The majority of testosterone (90%) is secreted by the

Leydig cells of the testes under the control of LH, secreted from the anterior pituitary

- Metabolised adrenal androgen accounts for the remaining 5–10% of testosterone
- Testosterone is converted to DHT by the enzyme

 5α -reductase type II, which is found in high concentration in the prostate and the perigenital skin

■ DHT has five times the potency of testosterone

Benign prostatic hyperplasia (BPH)

■ Occurs in men over 50 years of age; by the age of 60 years, 50% of men have histological evidence of BPH

■ Is a common cause of significant lower urinary tract symptoms in men and is the most common cause of bladder outflow obstruction in men >70 years of age

Summary box 73.3

Consequences of BPH

- No symptoms,no BOO
- No symptoms, but urodynamic evidence of BOO
- Lower urinary tract symptoms, no evidence of BOO
- Lower urinary tract symptoms and BOO
- Others (acute/chronic retention, haematuria, urinary infection and stone formation)

Summary box 73.4

Investigations of men with LUTS

Essential investigations

- Urine analysis by dipstick for blood, glucose and protein
- Urine culture for infection
- Serum creatinine
- Urinary flow rate and residual volume measurement

Additional investigations

- PSA if indicated
- Pressure–flow studies

Options for treatment of LUTS secondary to BPH

• Conservative measures include watchful waiting in conjunction with fluid restriction and reduction in caffeine intake

• Drug therapy is with α -blockers or, in men with a large prostate, a 5α -reductase inhibitor, or both

■ Interventional measures include transurethral resection of the prostate (TURP), which remains the 'gold standard'; consider open prostatectomy for large glands

Summary box 73.6

Prostate cancer detection

■ The incidence has increased, and opportunistic PSA testing

has enabled the detection of early-stage disease

■ It is not yet clear whether national screening programmes for prostate cancer should be instigated

■ Patients should be counselled about the investigations and treatment options available before a PSA test is performed

Summary box 73.7

The natural history of prostate cancer

This depends on the stage and grade of disease:

T1 and T2

■ The progression rate of well-differentiated T1a prostate

cancer is very low:10-14% after 8 years.For moderately

differentiated tumours, the rate is about 20%

■ For T1b and T2 tumours, the rate is in excess of 35%

T3 and T4 (M0)

■ About 50% progress to bony metastases after 3–5 years

M1

■ The median survival of men with metastatic disease is about 3 years

Summary box 73.8

The presentation of men with prostate cancer

■ Often men are asymptomatic, and detection is by opportunistic PSA testing

■ Cancer is detected in men describing LUTS or may present with symptoms from metastatic disease

Summary box 73.9

Treatment and stage

■ Treatment options for prostate cancer depend on stage of

disease, life expectancy of the patient and patient preference

- PSA,DRE and biopsy Gleason grade are used to predict pathological stage
- Localised cancer can be treated by radical prostatectomy,

radiation therapy and active monitoring

Treatment of advanced disease is palliative, and hormone ablation remains the first-line therapy

74. Urethra and penis

Summary box 74.1

Congenital urethral valves

- Posterior urethral valves cause obstruction to the urinary tract in young boys
- Antenatal ultrasound scanning typically shows urinary tract dilatation in affected boys

Hypospadias

• Avoid circumcision as prepuce may be used in procedures to correct the abnormality

Summary box 74.3

Urethral injury

Suspect urethral injury after blunt perineal trauma when:

- The man goes into retention
- There is massive perineal swelling
- There is blood at the urethral meatus

Summary box 74.4

Urethral trauma

■ It is safest to insert a suprapubic catheter before referral to a urologist

Summary box 74.5

Lower urinary tract injury in pelvic trauma

When the lower urinary tract is injured in a patient who has suffered multiple trauma:

• Definitive treatment can usually be deferred if a suprapubic catheter is in place

• Exploration is needed if there is evidence of rupture of the bladder, especially if it is intraperitoneal

Summary box 74.6

Urethral dilatation

• Urethral dilatation for stricture is liable to cause additional urethral damage if performed inexpertly

Endoscopic urethrotomy

■ Cures about 50% of simple strictures

May be supplemented by intermittent self-dilatation postoperatively with improved success rate

Summary box 74.8

Circumcision

- Is most commonly performed for cultural reasons
- Is not indicated for failure of retraction caused by

congenital adhesions between the glans penis and the prepuce

■ Is indicated when there is true phimosis with balanoposthitis or obstruction to urinary flow

Summary box 74.9

Warning

Never use monopolar diathermy when performing circumcision

Summary box 74.10

Peyronie's disease

- Medical treatments are often ineffective
- The disease is typically self-limiting
- Surgery may be indicated to correct deformity that interferes with sexual function

Summary box 74.11

Prolonged priapism

Prolonged priapism is associated with erectile dysfunction,

especially if surgical decompression by shunt formation is performed

Carcinoma of the penis

- Relatively uncommon
- Enlargement of superficial inguinal lymph nodes may be

caused by infection or metastatic spread

■ May be treated by a combination of surgery and radiotherapy

75.Testis and scrotum

Summary box 75.1

Undescended testis

- Testes absent from the scrotum after 3 months of age are unlikely to descend fully
- An incompletely descended testis tends to atrophy as puberty approaches
- Early repositioning of an incompletely descended testis can preserve function

Summary box 75.2

Retractile testis

Retractile testes are more common than incompletely descended testes and require no treatment

Summary box 75.3

Orchidopexy

■ An increased liability to malignant disease is not necessarily corrected by orchidopexy but early diagnosis of a tumour is easier

Summary box 75.4

Scrotal trauma

• Scrotal exploration should be considered when there is

massive swelling and pain after scrotal trauma

Testicular torsion

- Prompt exploration, untwisting and fixation is the only way to save the torted testis
- The patient should be counselled and consented for orchidectomy before exploration
- The anatomical abnormality is bilateral and the contralateral testis should also be fixed

Summary box 75.6

Varicocele

■ Varicocele is a common condition and tends to recur after

surgical treatment.Its association with subfertility is difficult to prove

Summary box 75.7

Testicular malignancy and hydrocele

■ Testicular malignancy is an uncommon cause of hydrocele

that can be excluded by ultrasound examination of the scrotum

Summary box 75.8

Cysts associated with the epididymis

- Are separate from the testis on palpation
- Unless large or uncomfortable may be treated

conservatively when diagnosed with certainty using ultrasound

Summary box 75.9

Acute epididymo-orchitis

- May be secondary to urinary infection or urethritis
- Is a complication of catheterisation or instrumentation of the urinary tract
- May need aggressive treatment with parenteral antibiotics

Testis tumours

- A scrotal lump that cannot be felt separately from the testis may be a malignant tumour
- Lymphatic spread is to the retroperitoneal and intrathoracic lymph nodes
- Pulmonary metastases suggest that the tumour is a teratoma

Summary box 75.11

Testis tumour markers and prognosis

■ Tumour markers help to make the diagnosis and to follow the effectiveness of treatment

Prognosis is excellent when the patient is treated with combination chemotherapy in a cancer centre

Summary box 75.12

Fournier's gangrene

■ Idiopathic scrotal gangrene (Fournier's gangrene) requires

early and aggressive treatment if the patient is to survive

Summary box 75.13

Male infertility

- Atrophy of the testis is associated with raised levels of gonadotrophin in the blood
- Testicular biopsy will show whether azoospermia is a result

of obstruction or failure of sperm maturation

■ If spermatozoa can be harvested they can be used in ICSI with a fertility rate of around 30%

Summary box 75.14

Vasectomy

• Counselling before vasectomy should include mention of the irreversibility of the procedure, the possibility of spontaneous recanalisation and the risk of chronic scrotal pain postoperatively

