Chapter 42
Acute Problems and Emergency Surgery: Abdominal Complaints and Acute Surgical Emergencies

Walter Henny and David M. Nott

Abstract The authors of this chapter include specialists, many of whom have extensive deployment experience. The target group of this chapter, however, is not their fellow-specialists; but the "junior" doctors, trying to help them find their way in the difficulties posed by an "adverse" environment. That junior doctor will be confronted by all imaginable ailments and injuries, and should be a true generalist. As we're all aware, even in medical school nowadays there's a tendency to make students choose the direction of their future work at an ever earlier stage; the opposite of what's needed for a generalist.

Keywords Triage • Trauma and medical emergencies • Ballistic and blast injury • Infectious diseases • Climatic influences • Bites and stings • Maxillofacial problems • Head and spinal cord injuries • Abdominal complaints • Non-traumatic surgical emergencies • Soft tissues and skeleton • Surgery in the tropics • Anaesthesia and analgesia • Hostile environments • Disaster environments • Conflict environments • Catastrophe environments

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We would like to acknowledge that Adam Brooks was a co-author of this subchapter on Abdominal Complaints and Acute Surgical Emergencies in the previous edition, and that sub-chapter served as the starting point for this updated and revised subchapter.

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Objectives
This part deals with surgical, (mainly) non-traumatic emergencies. It describes the range of abdominal complaints and conditions which may present and suggest a management approach suitable both for the hostile and for the more secure environment. Specifically, the following are discussed:

- Inflammation of the peritoneum
- Obstruction of a hollow viscus (small bowel, large bowel, biliary tract, urinary tract)
- Bleeding (intraperitoneal, retroperitoneal, intraluminal)
- Acute pancreatitis and mesenteric ischaemia, urinary tract infection and acute pyelonephritis, testicular torsion and acute epididymo-orchitis and haematoma of the abdominal wall

Introduction

Acute conditions should immediately make the responsible health professional ask:

1. Does this patient need operative treatment?
2. Can I provide that treatment or should the patient be transferred?

If the former question has been answered negatively, the patient should be reassessed frequently: the patient may deteriorate in which case the treatment plan may have to be altered.

The answer to the latter question depends in the first place on your own skills and the availability of resources; in an austere environment other factors such as possibility of transportation, distance to and capabilities of the next treatment facility and the tactical situation have to be taken into account as well.

In this part the following acute conditions will be discussed:

- Abdominal complaints
- Other surgical emergencies
  - Superficial abscesses
  - Acute ischaemia of a limb

Abdominal Complaints

Referring to Chap. 35 Non trauma, it should be understood that what is described next is part of the section "Secondary assessment".

In assessing patients with abdominal complaints, it should be realized that there are several confounders:

- Abdominal complaints may be caused by disease processes located outside the abdomen: myocardial infarction and pneumonia. Also the chest should be examined in all patients with abdominal complaints.
- Systemic abnormalities may present as abdominal complaints: uraemia, diabetes mellitus, acute porphyria, sickle cell crisis and lead intoxication. These possibilities should be addressed in the history.
- Medications such as morphine and corticosteroids will assuage the severity of complaints and the findings at physical examination.
- Complaints and findings may be less clear-cut in young children and the elderly.

Whilst assessing the patient, the essential question is: does this patient need surgery? You should be thinking in "processes"; the exact organ which gives rise to the presenting complaints is, with a few exceptions, less important.

Assessment rests on three pillars:

- History
- Physical examination
- Laboratory tests and imaging (*in an austere environment often not or hardly available*, *which may necessitate transfer*)

History

This should cover:

- Age and sex
- Complaints and their characteristics
  - Most important complaint
  - Sudden or gradual onset
  - Site and possible movement of pain
  - Radiation of pain
  - Constant or fluctuating pain
  - Relieving and aggravating factors
  - Appetite
  - Vomiting: frequency and aspect of vomitus
  - Flatus, constipation and diarrhoea
  - Micturition: frequency, pain
  - Bleeding from orifices
  - Menstrual cycle, vaginal discharge
  - Fever
  - Medications
  - Allergies

Physical Examination

This should cover:

- General impression
  - Well/unwell
  - Pale and jaundiced
  - Lying still/agitated
- Vital signs
  - Pulse
  - Blood pressure
  - Respiratory rate
  - Temperature
- Chest (lung base consolidation, cardiac dysrhythmia)
- Abdomen
  - Inspection (including groins): scars, distension, movement on respiration and lumps
  - Palpation (including groins): tenderness, guarding, rebound tenderness, rigidity, masses and hernias
  - Percussion: dull/tympanic and tenderness
  - Auscultation: tinkling/normal/diminished/silent. Note: some physicians prefer to perform auscultation before percussion/palpation, as touching the abdomen before auscultation might lead, in their opinion, to "spurious bowel sounds" (in particular in the abdomen with diminished/absent peristalsis).
  - Note: the quadrant of the abdomen where the complaints and findings are mainly localized may give some indication of the most likely involved organ.
  - Right upper: gallbladder and liver
  - Right lower: appendix, fallopian tube, ovary and ureter
  - Left lower: large bowel (diverticulitis), fallopian tube, ovary and ureter
  - Flanks: kidney
  - Middle upper: pancreas and stomach
  - Middle lower: bladder
- Internal examination (rectal, vaginal)

Laboratory Tests and Imaging

- Blood: haemoglobin, white cell count, CRP, sedimentation rate, electrolytes, urea, creatinine, glucose, amylase and liver function tests.
- Urine: dipstick (blood, protein, ketones, white cells, glucose, bilirubin) and sediment.
- Chest/abdominal X-ray (basal pulmonary consolidation, free gas, distended bowel, fluid levels).

- Ultrasound (calculi, aneurysm, gynaecological pathology).
- Contrast X-ray, CT, and endoscopy will not be often available.

Differentiation and Management

There are four main groups of causes of abdominal complaints:

1. Inflammation of the peritoneum
2. Obstruction of a hollow viscus
   - Small bowel
   - Large bowel
   - Biliary tract
   - Urinary tract
3. Bleeding
   - Intraperitoneal
   - Retroperitoneal
   - Intraluminal
     - Digestive tract
     - Urinary tract
     - Genital tract
4. Miscellaneous
   - Acute pancreatitis
   - Acute mesenteric ischaemia
   - Urinary tract infection and acute pyelonephritis
   - Testicular torsion and acute epididymo-orchitis
   - Haematoma of the abdominal wall

Not all these conditions warrant operative treatment, but many do. Newer treatment modalities, such as interventional endoscopy/laparoscopy/sonography-guided aspiration and angiographic embolization, will not be discussed, as they are rarely available in an austere environment.

In all instances it is extremely important that the patient be stabilized haemodynamically, as much as possible (part of the "Primary Assessment"). Recording the fluid balance, especially urine output, is vital, and nasogastric aspiration should be commenced where vomiting continues.

Inflammation

Inflammation usually begins on the inside of a hollow viscus, tending to spread through the entire wall and leading to involvement of the adjacent peritoneum and/or frank perforation. In both cases generalized peritonitis will result.

History

- Continuous pain, not severe and ill-defined at first (visceral pain), at a later stage severe and well localized
- Some vomiting, not very productive
- Some constipation
- Little fever at first, at a later stage (much) higher

Examination

- *Inspection*: lying still
- *Palpation*: tenderness, at a later stage rebound tenderness, then rigidity
- *Percussion*: at first normal, at a later stage ipsilateral, then also contralateral pain
- *Auscultation*: diminishing bowel sounds, silence at a later stage
- *Internal examination*: possible tenderness
- Note: some physicians prefer to perform auscultation before percussion/palpation, as touching the abdomen before auscultation might lead, in their opinion, to "spurious bowel sounds" (in particular in the abdomen with diminished/absent peristalsis).
- Note: in the case of frank perforation, generalized peritonitis will develop (as described earlier under "at a later stage"), often in a short period of time (occasionally without the preceding complaints and findings).

Laboratory and Imaging

- WCC ↑, CRP↑
- Erect chest X-ray: free abdominal gas under the diaphragm in cases of perforation

Treatment

When the findings mentioned under "at a later stage" are present, this implies involvement of the peritoneum: operative treatment is warranted. Ideally inflamed structures are removed before peritoneal involvement has occurred.

There are exceptions to this guideline. In some instances conservative treatment is warranted because surgery does not lead to a better outcome:

- Several abdominal diseases which have become rare in the developed world (e.g. tuberculosis, helminth infection of the biliary tract, splenic infarct). You are referred to the relevant paragraphs in this book and to textbooks on tropical medicine.
- Diverticulitis coli

This may occur in middle-aged and elderly people, who will have all the signs of inflammation in the left lower quadrant, including peritoneal involvement.

However, if conservative treatment (consisting of bed rest, nothing by mouth and intravenous fluids), with or without antibiotics (the latter is a matter of personal preference), does not lead to resolution or if perforation occurs, surgery is indicated.

- Salpingitis

This may occur in younger women, with painful adnexa on bimanual vaginal examination. Treatment is with antibiotics. Again surgery is indicated if this approach does not lead to resolution or if perforation occurs.

- Crohn's disease

This ailment should be considered if the history is positive. Treatment consists of anti-inflammatory drugs and possibly steroids. Frank perforation (the signs of which may be obscured if steroids have been given!) should be treated operatively.

- Development of an "abdominal infiltrate"

The body tries to "isolate" an inflamed structure by enveloping it with greater omentum. Usually this process takes a couple of days. This diagnosis becomes likely if you see a patient who has had abdominal pain for 2–3 days and now seems to be getting better. If there are no signs of peritoneal involvement (the infiltrate can sometimes be palpated as a mass) and the patient has a considerably elevated sedimentation rate, conservative treatment (consisting of bed rest, nothing by mouth and intravenous fluids) is justified. Administration of antibiotics is a matter of personal preference. However, an abscess that develops within the infiltrate (diagnosed by a see-saw fever pattern) should be drained surgically.

Note: in cases of generalized peritonitis, antibiotics should be begun preoperatively.

Obstruction of a Hollow Viscus

Mechanical obstruction of the bowel arises from a number of causes.

- Outside the wall: hernias, adhesions from previous operations and volvulus
- In the wall: tumours
- In the lumen: gallstones, foreign bodies and bezoars

If the blood supply to the bowel is compromised, it is a strangulating obstruction.

Small Bowel

History

- Severe, intermittent, cramping pain, often with agitation during cramps
- Frequent vomiting (in parallel with cramps), which remains productive and becomes eventually faecalent (may lead to hypovolemia and shock)

- No constipation at first
- No fever (if fever occurs it may be indicative of strangulation)

Examination

- *Inspection*: agitation during cramps; abdomen may be distended; occasionally visible peristalsis; sometimes visible scars from previous operations. Note: also look for swelling in the groin and umbilical areas (incarcerated = irreducible hernia).
- *Palpation*: some tenderness, no signs of peritoneal involvement. Note: in cases of strangulation (ischaemia of the bowel wall) perforation will occur; the clinical picture then changes to one of generalized peritonitis.
- *Percussion*: often tympanitic.
- *Auscultation*: high-frequency "tinkling" (during cramps). Note: if on auscultation the abdominal sounds seem to normalize or is infrequent, but the patient does NOT improve generally, the bowel may be in ileus (aperistalsis).
- *Internal examination*: normal.

Note: some physicians prefer to perform auscultation before percussion/palpation, as touching the abdomen before auscultation might lead, in their opinion, to "spurious bowel sounds" (in particular in the abdomen with diminished/absent peristalsis).

Laboratory and Imaging

- No specific tests, in severe cases acid–base and electrolyte abnormalities. WCC ↑ may be indicative of strangulation.
- Erect abdominal X-ray: distended loops of bowel and fluid levels.

Treatment

Treatment depends to a certain degree of the severity of the underlying abnormality. An initial conservative regime of intravenous fluids, a nasogastric tube and urinary catheter, and close observation is justified, unless:

- The patient is very ill with signs of peritonitis.
- There are signs of impending strangulation.
- The patient fails to settle within 12 h.

In those cases prompt operative intervention is indicated.

Large Bowel

Obstruction of the large bowel is most often seen in elderly patients. The cause is usually a neoplasm, occasionally inspissated faeces (stercoral ileus).

History

- Alteration in bowel habit
- No defecation (sometimes with "false" diarrhoea)
- Little pain
- Sometimes vomiting (at a late stage)
- No fever

Examination

- *Inspection*: abdomen may be distended, later very distended.
- *Palpation*: sometimes a "full" descending colon, no signs of peritoneal involvement.
- *Percussion*: usually no abnormalities, occasionally a tympanitic area in the right lower quadrant, later generalized tympany.
- *Auscultation*: no abnormalities, at a late stage some high frequency.
- *Internal examination*: a low rectal tumour may be palpable

Note: some physicians prefer to perform auscultation before percussion/palpation, as touching the abdomen before auscultation might lead, in their opinion, to "spurious bowel sounds" (in particular in the abdomen with diminished/absent peristalsis).

Laboratory and Imaging

- No specific tests
- Abdominal X-ray: occasionally a distended caecum, no gas in the rectum

Treatment

- "Gentle enema" if inspissated faeces (stercoral ileus) is suspected
- Operation if caecum has a diameter >10–12 cm and depending on general condition

Biliary Tract

History

- Severe, intermittent, cramping pain in the right upper quadrant or flank, often with agitation during cramps
- Infrequent vomiting
- Sometimes jaundice
- Normally no fever

Examination

- *Inspection*: normal, sometimes jaundice
- *Palpation*: some tenderness in the right upper quadrant
- *Percussion*: normal
- *Auscultation*: normal
- *Internal examination*: normal

Note: some physicians prefer to perform auscultation before percussion/palpation, as touching the abdomen before auscultation might lead, in their opinion, to "spurious bowel sounds" (in particular in the abdomen with diminished/absent peristalsis).

Laboratory and Imaging

- Sometimes bilirubin ↑ and alkaline phosphatase↑.
- Sonography may show stones in gallbladder.

Treatment

- Conservative with fluids and analgesia.
- Administration of antibiotics is a matter of personal preference.

Note: Charcot's triad – pain, jaundice and fever. The diagnosis is obstructive cholangitis; because of the risk of septicaemia, the biliary tract should be drained operatively.

Upper Urinary Tract

History

- Severe, intermittent, cramping pain in one flank, often with agitation during cramps
- Infrequent vomiting
- Sometimes haematuria
- Normally no fever

Examination

- *Inspection*: normal
- *Palpation*: normal, sometimes some tenderness in the flank
- *Percussion*: normal

- *Auscultation*: normal
- *Internal examination*: normal

Note: some physicians prefer to perform auscultation before percussion/palpation, as touching the abdomen before auscultation might lead, in their opinion, to "spurious bowel sounds" (in particular in the abdomen with diminished/absent peristalsis).

Laboratory and Imaging

- Sometimes haematuria
- Sonography may show a dilated renal pyelum.

Treatment

- Conservative with fluids and analgesia.
- Administration of antibiotics is a matter of personal preference.

Note: If fever is present the diagnosis is obstructive pyelonephritis; because of the risk of septicaemia, the urinary tract should be drained operatively.

Lower Urinary Tract (Acute Urinary Retention)

History

- Gradually increasing difficulties with passing urine (hypertrophy of the prostate) or sudden onset (stones, clot).
- Patient may be quite ill, with hypotension.
- Normally no fever.

Examination

- *Inspection*: distended lower abdomen
- *Palpation*: tender mass in the lower abdomen
- *Percussion*: dullness in the lower abdomen
- *Auscultation*: normal
- *Internal examination*: occasionally enlarged prostate, otherwise normal

Note: some physicians prefer to perform auscultation before percussion/palpation, as touching the abdomen before auscultation might lead, in their opinion, to "spurious bowel sounds" (in particular in the abdomen with diminished/absent peristalsis).

Laboratory and Imaging

- Sonography will show an enlarged bladder.

Treatment

- Introduction of a urinary catheter; if that cannot be passed, then suprapubic catheterisation
- In case of prostatic hypertrophy, definitive treatment of that condition at a later stage

  Note: if fever is present antibiotic treatment is also warranted.

Bleeding

In bleeding *the most important guide* for deciding what treatment to give is the *haemodynamic status* of the patient.

Intraperitoneal

This is most often caused by trauma (liver, spleen), occasionally by a ruptured aneurysm. In the latter case the patient has usually died before being seen by a health professional.

History

- In trauma cases this is usually is obvious (also see Chap. 35).
- There may be some pain.
- A ruptured aneurysm leads to tearing pain in the back.

Examination

- *Inspection*: In trauma cases there may be bruising or wounds of the abdominal wall. Distension of the abdomen is a late sign.
- *Palpation*: Some tenderness because blood acts as an irritant in the abdomen. Rebound tenderness and rigidity are late signs. An aneurysm may be felt as a pulsating mass.
- *Percussion*: May be dull.
- *Auscultation*: Bowel sounds may be diminished.
- *Internal examination*: Possible tenderness.

Note: some physicians prefer to perform auscultation before percussion/palpation, as touching the abdomen before auscultation might lead, in their opinion, to "spurious bowel sounds" (in particular in the abdomen with diminished/absent peristalsis).

Laboratory and Imaging

Tests are initially normal. A drop in haemoglobin is a late sign.
Sonography will show free abdominal fluid, and if an aneurysm is the cause of intraperitoneal bleeding, sonography will confirm its presence.

Treatment

- A ruptured aneurysm should always be treated operatively, likewise the other causes of intraperitoneal bleeding if the patient is in shock.
- Non-shocked patients may be managed nonoperatively.

Retroperitoneal

This is caused either by trauma (kidney, pelvis) or by a ruptured aneurysm.

History

- In trauma cases this is usually is obvious (also see page 547, 550).
- There may be some pain.
- A ruptured aneurysm leads to tearing pain in the back.

Examination

- *Inspection*: In trauma cases there may be bruising or wounds of the back and/or flanks.
- *Palpation*: No obvious findings. An aneurysm may be felt as a pulsating mass.
- *Percussion*: Unremarkable.
- *Auscultation*: Bowel sounds may be diminished.
- *Internal examination*: Unremarkable.

Note: some physicians prefer to perform auscultation before percussion/palpation, as touching the abdomen before auscultation might lead, in their opinion, to "spurious bowel sounds" (in particular in the abdomen with diminished/absent peristalsis).

Laboratory and Imaging

- Tests are initially normal. A drop in haemoglobin is a late sign.
- Sonography will confirm injury to the kidney and the presence of an aneurysm.

Treatment

- A ruptured aneurysm should always be treated operatively.
- Other causes are treated conservatively; unless the patient becomes hypotensive, then surgical hemostasis is necessary.

Intraluminal

There is a variety of non-traumatic causes for bleeding from the digestive, urinary and genital tracts.

Haematemesis is associated with bleeding from the upper digestive tract (proximal of the pylorus); bleeding from the more distal digestive tract usually presents as haematochezia. The colour of blood lost rectally may give an indication about the localization of its source: the darker, the more proximal which can present as frank melaena; bleeding from the urinary tract presents as haematuria.

A ruptured ectopic pregnancy should be considered in every women of childbearing age who is experiencing lower abdominal pain, with or without vaginal bleeding.

You are referred to obstetrical textbooks for information on bleeding in a well-established pregnancy and around the time of childbirth.

Management of non-traumatic bleeding is highly influenced by the haemodynamic status of the patient.

History

- Bleeding is the main complaint, as described earlier.
- Sometimes pain (upper abdomen for upper digestive tract, flank for urinary tract, lower abdominal for genital tract).

Examination

- *Inspection*: normal.
- *Palpation*: sometimes tenderness in the upper abdomen (upper digestive tract), flanks
- (urinary tract) and lower abdomen (genital tract).

- *Percussion*: unremarkable.
- *Auscultation*: unremarkable. Peristalsis may be active in bleeding from the digestive tract.
- *Internal examination*: an ectopic pregnancy may be felt in one of the adnexa on bimanual vaginal examination.

Note: some physicians prefer to perform auscultation before percussion/palpation, as touching the abdomen before auscultation might lead, in their opinion, to "spurious bowel sounds" (in particular in the abdomen with diminished/absent peristalsis).

Laboratory and Imaging

- An ectopic pregnancy may be present with or without a positive pregnancy test.
- Bleeding from the digestive or urinary tracts requires finding the source (e.g. by endoscopy).

Treatment

- An ectopic pregnancy should be treated operatively.
- Bleeding from the digestive and urinary tracts can be treated conservatively with appropriate drugs such as omeprazole, as long as the patient remains haemodynamically stable, and the bleeding stops with a reasonable time span.

Miscellaneous

Acute Pancreatitis

History

- Extreme pain in the upper abdomen and back.
- Patient may be known with gallstones or alcohol abuse and is feeling very sick and looking very unwell.
- Fever may be present.
- Occasionally some vomiting.

Examination

- *Inspection*: normal. Cullen's sign and a discoloration in the left flank are extremely rare (representing retroperitoneal oozing).
- *Palpation*: tenderness in the epigastrium.

- *Percussion*: unremarkable.
- *Auscultation*: unremarkable.
- *Internal examination*: unremarkable.

Note: some physicians prefer to perform auscultation before percussion/palpation, as touching the abdomen before auscultation might lead, in their opinion, to "spurious bowel sounds" (in particular in the abdomen with diminished/absent peristalsis).

Laboratory and Imaging

- Amylase ↑↑↑.
- Sonography may show an enlarged pancreas.

Treatment

- Most cases of acute pancreatitis can be treated conservatively, with careful monitoring.
- If hypotension occurs, operative exploration is warranted.

Acute Mesenteric Ischaemia

History

- Extreme pain in the abdomen.
- The patient is feeling very sick and looking very unwell.
- Occasionally some vomiting and/or bloody diarrhoea.
- No fever.

Examination

- *Inspection*: unremarkable but pain out of proportion with signs
- *Palpation*: unremarkable
- *Percussion*: unremarkable
- *Auscultation*: unremarkable
- *Internal examination*: unremarkable

Note: some physicians prefer to perform auscultation before percussion/palpation, as touching the abdomen before auscultation might lead, in their opinion, to "spurious bowel sounds" (in particular in the abdomen with diminished/absent peristalsis).

Laboratory and Imaging

- WCC ↑↑↑ and base excess ↓↓↓ ("pathognomonic")

Treatment

- This condition is almost always untreatable.
- Usually a laparotomy is performed to exclude other pathologies.

Urinary Tract Infection and Acute Pyelonephritis

History

- UTI presents with burning pain on passing urine, with frequency and urgency.
- Acute pyelonephritis is associated with abdominal or loin pain, haematuria and fever.

Examination

- Tenderness in flank and/or loin

Laboratory

- WCC ↑, positive dipstick and microscopy

Treatment

- Antibiotics

Testicular Torsion and Acute Epididymo-orchitis

History

- This occurs mainly in adolescents.
- Sudden onset of severe pain in the scrotum (one sided), with occasional radiation to the lower abdomen.
- No fever.

Examination

- Swollen testis; extremely painful on examination

Note: this condition should be differentiated from epididymo-orchitis (which presents with fever and pain on passing urine). When in doubt, it "is" testicular torsion!

Treatment

Operative derotation and fixation of both testes

Haematoma of the Abdominal Wall

History

- Often, but not necessarily, there is a history of blunt trauma.
- Pain.

Examination

- Occasionally discoloration
- Sometimes swelling
- Pain on palpation
- No signs of peritoneal involvement

Note: it is important to exclude a (incarcerated) hernia (see under Obstruction of Small Bowel)

Treatment

- Conservative

Other Surgical Emergencies

Abscesses

Soft Tissue Abscess

History

- Any infection of the soft tissues may give rise to formation of an abscess.
- Pain.
- Fever.

Examination

- Red, swollen area with fluctuation

Treatment

- Incision (parallel to Langer's lines) and drainage.
- Occasionally a foreign object like a splinter is found.

Breast Abscess

History

- Recent breast-feeding, usually following acute mastitis

Examination

- Red, tender swelling which may become fluctuant

Treatment

- Incision, following the edge of the areola
- Drainage

Anorectal Abscess

History

- Throbbing pain in the perianal area. Sitting down is extremely painful.
- Fever.

Examination

- Tender mass in the perianal area clinches
- Occasionally no visible abnormalities
- Very painful rectal examination

Treatment

- Incision and drainage

Acute Ischaemia of a Limb

Acute arterial occlusion may be the result of embolus from a distant source or thrombosis on underlying atherosclerotic disease.

History

- Acute onset of extreme pain
- Possibly recent myocardial infarction or atrial fibrillation (embolus) and intermittent claudication (arterial thrombosis)

Examination

- Pain
- Pallor
- Paraesthesia
- Paralysis
- Cold
- Absence of arterial pulsations in femoral, popliteal and distal arteries

Treatment

- In order to save the limb, perfusion must be restored as soon as possible:
- Surgical removal of emboli; anticoagulation.