

LECTURE 2

ABDOMINAL TRAUMA

CLINICAL MANAGEMENT OF ABDOMINAL TRAUMA

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Contributing to improved outcome in trauma care, non-operative management (NOM) has become the treatment of choice in most patients suffering blunt abdominal injury throughout the last decade with success rates well above 80%. NOM requires the patient to be haemodynamically stable and with no other indications for laparotomy. More recently, NOM has been successfully applied in the treatment of selected penetrating injuries. Angiography has evolved to become a useful adjunct to both operative and non-operative management in selected cases. With this general trend towards NOM and the treatment secured by interventional radiological procedures, only the most difficult cases remain to be performed as open procedures, thus limiting the possibilities for gaining surgical proficiency.

The initial assessment of the severely injured patient with suspected abdominal injuries should aim at detecting and treating all immediately life-threatening conditions. Severe abdominal injuries represent a major challenge because of acute haemorrhage and problems with rapid control of the bleeding site. This is underlined by evidence showing that the majority of acute trauma deaths in hospital are due to exsanguination.

The weight of published literature supports haemodynamic instability and peritonitis as laparotomy indications in both blunt and penetrating injuries, whereas other indications remain subject to debate.

Blunt abdominal injury

The key decision point is the haemodynamic stability of the patient. Patients who are admitted after blunt trauma and who are in shock need to get obstructive causes of shock like tension pneumothorax and cardiac tamponade ruled out as well as the primary source of bleeding detected quickly.

The 5 anatomic locations where bleeding can cause shock are: external, long-bone fractures, chest, and abdominopelvic cavity (intraperitoneal or retroperitoneal). Chest x-ray, pelvic x-ray and FAST/DPL can be helpful in defining the most compelling source of bleeding. Intraabdominal bleeding in the unstable patient warrants laparotomy and damage control approach should be considered.

Clinical examination of the abdomen is unreliable in diagnosing haemorrhage needing surgical intervention. An expedient bedside diagnostic test is required to detect blood. FAST is efficient and may detect intraperitoneal fluid, directing the search for haemorrhage to the abdomen. However, due to questionable sensitivity, DPL should remain a diagnostic option when FAST is negative or indeterminate.

The patient in shock with severe pelvic injury has a high risk of concomitant abdominal injury, and a significant mortality (20%-50%). Intraabdominal haemorrhage has to be ruled out. The sensitivity of FAST decreases in the presence of retroperitoneal haematoma, and DPL should be considered. Intraabdominal haemorrhage in the unstable patient mandates laparotomy. If the pelvis represents a significant source of bleeding, and in the patient exsanguinating from a pelvic injury, extraperitoneal pelvic packing (EPP) should be performed. If the patient responds to resuscitation, angioembolization (AE) is the preferred treatment and should be performed preferably after CT scan. Angiography should also be performed after DCS with EPP.

The haemodynamically stable or stabilized patient with blunt injury is best investigated with abdominal CT scan. However, CT is time-consuming and the grossly unstable patient should not be transported to a CT scanner. Surgical intervention or interventional radiology are indicated in the presence of contrast extravasation from solid organs or other vessels, pancreatic duct injury, hollow

viscus injury including intraperitoneal bladder injury. Hollow viscus injuries have a tendency to present late, and all existing diagnostic tests have low sensitivities shortly after the time of injury.

Morbidity associated with non-therapeutic laparotomies is significant. On the other hand, missed injuries seem to occur infrequently.

AE has become a useful adjunct in the treatment of solid abdominal organs as well as pelvic injuries. In liver and spleen injuries, AE seems to increase the fraction undergoing NOM (60-80%), paralleled by increased success rates (>90%). However, the exact role of AE still remains somewhat unclear.

Penetrating abdominal injuries

As in blunt injuries, the key point is whether the patient is haemodynamically stable or not. The patient who presents with penetrating abdominal injury, who is in shock, with peritonitis or with haematuria, haematemesis or blood on rectal exam should undergo immediate laparotomy. Whether evisceration of abdominal contents mandates laparotomy is debated.

Clinical examination should reveal the presence of multiple stab or gunshot wounds. Further investigation should aim at determining trajectories and the main source(s) of bleeding. In the unstable patient, plain x-ray, FAST and DPL may aid in determining whether the most compelling source of bleeding is in the abdomen.

In the haemodynamically normal patient, further investigations will depend on patient consciousness, concomitant injuries and available experience and resources. Traditionally, treatment protocols mandated laparotomy in face of peritoneal penetration. However, mandatory laparotomy for penetrating abdominal injury is associated with high rates of non-therapeutic laparotomies, ranging from 23% - 57% with complication rates ranging from 12% to 41%. Selective NOM of stab wounds to the abdomen has become standard treatment in the US and is evolving in Europe. However, judicious selection of patients suitable for NOM after penetrating injuries is more challenging with the scarce experience gained in most European countries. Requirements are: haemodynamically normal patient,

awake and cooperating, with pain located exclusively around the wound. Observation is labour intensive, requiring frequent examination by the same clinician.

FAST adds little in the investigation of the stable patient with penetrating injuries. DPL is highly sensitive but results in high rates of non-therapeutic laparotomies. CT seems to be able to exclude peritoneal penetration, but is less reliable in detecting hollow viscus injuries in the presence of peritoneal penetration. The role of laparoscopy in trauma has yet to be defined. In left thoracoabdominal penetrating injuries, laparoscopy might be indicated to diagnose diaphragmatic penetration. However, in the presence of diaphragmatic injury and because of questionable sensitivity in excluding hollow viscus injury, a full exploratory laparotomy should probably be performed.

NOM after selected abdominal GSW is practiced in high volume trauma centres. With scarce experience gained in most European countries, the threshold for laparotomy after abdominal GSW should be low.

Summary

The treatment of abdominal injuries is increasingly non-operative, requiring judicious selection to avoid missed injuries and complications. Unstable patients with intraabdominal haemorrhage still need urgent laparotomy to stop the bleeding and prevent sepsis. Surgical decision-making is based on the patient's physiology and appropriate investigations.

Recommended reading

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