

# ABDOMINAL INJURIES IN ROAD TRAFFIC ACCIDENTS

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## Incidence

The incidence of closed abdominal injuries in patients admitted to St. Luke's Hospital after being involved in road traffic accidents, though not alarmingly high, is certainly not negligible. Of course, in cases coming to post-mortem, abdominal injuries are found in a higher proportion, usually associated with other lethal injuries to head and chest. This comparatively low incidence is probably due to the fact that most traffic accidents take place at low speeds, partly because our roads do not encourage high speed driving (Camilleri, 1968). It is possible that with improvement in our roads the incidence of these injuries will rise though never to such proportions as in countries with long stretches of first class roads and motorways.

Abdominal injuries can be sustained by pedestrians knocked down by moving vehicles, drivers thrown forward against the steering wheel, passengers knocking themselves against the interior of vehicles and cyclists who hit their abdomens against the handle-bars. In contrast to head injuries, which are commoner in those sitting in the front seat, the position of passengers inside a car seems to have no bearing on the incidence of abdominal injuries. Although horse-drawn vehicles are still fairly common on our roads their drivers do not appear to sustain abdominal injuries to any great extent. A number of different mechanisms may be responsible for producing these injuries including compression, avulsion, shearing stresses, direct laceration by bony structures and excessive rise in intra-luminal pressure in the case of hollow viscera. Fixed organs are more liable to injury than mobile ones with the exception of the pancreas which is injured in only 1-2% of cases. In trauma to the upper abdomen, the spleen is most often involved (Wilson, 1963), fol-

lowed by the liver and kidney. Hollow viscera are less commonly damaged. Injuries to the bile duct, gall bladder and ureters are rare and damage to the adrenals is even rarer.

## Diagnosis

The diagnosis of blunt intra-abdominal injury is always difficult and often obscured by shock, unconsciousness and the presence of other injuries to the head, chest and limbs. Not infrequently more than one abdominal viscus is involved. Parietal damage, haemoperitoneum, peritonitis and retroperitoneal haemorrhage may occur separately or together. Intraperitoneal injury may not be apparent for hours or days, for example small intestinal perforation, retroperitoneal damage to the duodenum or colon, gangrene of small bowel following injury to the mesentery and delayed rupture of the spleen. The value of repeated observations, preferably by the same experienced observer, cannot be too strongly emphasised.

History of the accident from the patient if he is conscious or from reliable witnesses, if he is unconscious, is often helpful. One should try to assess the velocity of impact from the state of the vehicles, whether the patient was thrown out and his position in the car at the time of the accident. No matter what other injuries exist one must always think of the possibility of abdominal injuries especially in the unconscious patient. If a conscious patient complains of pain in the abdomen, loin or back the matter must be given serious consideration. Where possible, inquire about the site and radiation of the pain, the passage of urine and whether it contained obvious blood. A desire to pass urine with inability to do so is very suggestive of bladder and/or urethral injury. The presence of shoulder pain may signify

diaphragmatic irritation from blood or intestinal contents.

On examination, the presence of pallor, cold clammy extremities and a rapid weak pulse are as important an indication of internal bleeding as a low blood pressure. Signs of continued bleeding when all visible bleeding has been stopped and the blood volume restored point to the abdomen as the source, provided thoracic injuries and major pelvic fractures have been excluded. The imprint of clothing on a yielding part of the abdominal wall means severe compression against the spin or back part of the pelvis, often with damage to mesentery or bowel wall (London, 1969). Local tenderness and guarding may or may not indicate damage to underlying structures. A rectal examination should be done in all cases as it may reveal rectal injury or a displaced prostate in complete rupture of the posterior urethra. In general, isolated abdominal physical signs can often be misleading (Proctor, 1967) and a general consideration of the clinical picture including the patient's response to resuscitation is often more helpful. Distension, increasing or spreading tenderness and rigidity and a rising pulse rate, however, are all significant.

There are three diagnostic ancillary methods which aid in the general if not in the specific diagnosis. These are radiology, diagnostic peritoneal tap and, to a lesser extent, laboratory investigations. Plain X-Rays of the abdomen may show fractures of the lower ribs or pelvis or the presence of free gas in the erect or lateral films. In retroperitoneal rupture of the duodenum, retroperitoneal gas bubbles with an exceptionally clear Psoas shadow may be found. Similarly, obliterated left renal and Psoas shadows, possibly with elevated left diaphragm, increased density in the left upper quadrant and shifting of the gastric air bubble suggest injury to the spleen. Of the specialised radiological procedures, using contrast media, I.V.P. is mandatory to exclude serious renal injury, when suspected, as well as to confirm the presence of a functioning contralateral kidney. Gastrograffin studies and cysto-urethrography are occasionally useful for demonstrating gas-

trointestinal and bladder/urethral injuries. Arteriography of the liver, spleen and kidneys remains of limited scope, particularly for technical reasons (Shepherd, 1971). Scanning with radioactive gold has been advocated to detect liver injuries (Walt, 1969). Four quadrant diagnostic peritoneal tap using a number 18 lumbar puncture needle or fine polythene tubing introduced through a thoracocentesis needle, can be of great assistance, if positive. The withdrawn fluid can be haemorrhagic, bile-stained or contaminated with faeces. A high amylase content in this fluid is very suggestive of pancreatic injury. A negative peritoneal tap, however, is of no significance (Morton et al., 1957). Of the laboratory investigations, serial haematocrit readings are of more value than a single haemoglobin estimation on admission. A very high serum amylase, when present, suggests damage to the pancreas, although it is not specific. Microscopic haematuria directs one's attention to the urinary tract.

In practice, the most important decision is whether to explore or not rather than to determine which particular organ has been damaged. If in doubt, it is better to look and see than to wait and see.

### Management

As in many cases abdominal injuries are found in association with other severe injuries to the head and chest, it is essential to perform a rapid initial assessment of the patient's condition, establish and maintain a patent airway and ensure effective respiratory exchange as a first step. The restoration of a depleted blood volume is of little or no avail unless respiratory function is quickly restored and adequately maintained (Gissane, 1967). Following this, severe bleeding must have high priority in treatment (Ward McQuaid, 1971). The requirements are rapid resuscitation using a wide bore intravenous cannula and adequate amounts of blood. Plasma or high molecular weight dextran may be used until blood becomes available. The insertion of a central venous pressure catheter is a useful guide to the adequacy of replacement and prevents overtransfu-

sion. It must be remembered that the surgical control of bleeding is often an integral part of resuscitation.

At laparotomy, wide exposure, is essential to allow proper inspection of all organs. Splenic rupture is easily and rewardingly dealt with by splenectomy. In liver injuries the objects are to stop the bleeding, to excise devitalised tissue by segmental resection or even lobectomy (Little and Williams, 1969), if necessary after extending the incision into the chest, and to provide drainage. Routine decompression of the biliary system by a T-tube is not universally accepted (Faris, 1972). Hilar injuries and those at the junction of the hepatic veins and the inferior vena cava remain a problem. Kidney damage is usually handled conservatively (Opit et al., 1960) and nephrectomy at emergency laparotomy for blunt injury should be rare, unless the kidney is diseased. Simple colonic perforations may be sutured; more severely damaged right colon may be dealt with by resection and anastomosis (Roberts and Lavelle, 1966); badly injured left colon is preferably exteriorised. Retroperitoneal haematomas near the bowel, especially duodenum and colon, must be explored (Ward McQuaid, 1971). Pancreatic injuries may require simple drainage (Thompson and McFarland, 1969), repair (Roberts and Lavelle, 1966), distal pancreatectomy or a Whipple type procedure depending on the extent and site of the injury. Ruptured diaphragm should be looked for and repaired. If left, it can lead to strangulation later (Miller and Howie, 1968) (Ward McQuaid, 1969). Bladder and or posterior urethral injuries are not uncommonly associated with severe fractures of the pelvis. Although it is usual to attempt catheterisation when these injuries are suspected, this is by no means the universally accepted management (Miller, 1961). Mitchell (1948, 1963) considers that catheterisation often converts an incomplete into a complete urethral rupture with the inevitable risk of stricture later. He advocates suprapubic cystostomy in all cases followed by endoscopic assessment of the damage after two to three weeks.

One must remain alert to the possibility of delayed and late complications developing days or weeks after the original injury (Petty, 1973). These include delayed rupture of the spleen (Kamal, 1967) and bowel, haemobilia and abscess after liver injuries and late pseudocyst formation in the pancreas. Late ileus usually means peritonitis, and may be due to gangrene from missed mesenteric injury.

### Conclusion

In conclusion, abdominal injuries from road traffic accidents are likely to become more common with increase in traffic density and improvement in the roads, encouraging, if not permitting, faster speeds. I am convinced, and statistics support my contention, that a properly fitted and worn seat belt can decrease considerably the incidence and severity of abdominal injuries to car occupants. When, however, these injuries occur we should endeavour to diagnose and treat them early and energetically because as Gissane pointed out in 1962, the Birmingham experience leaves us "in no doubt that any decrease in mortality and morbidity rates following severe intra-abdominal injuries is dependent more upon early and adequate resuscitation and surgery than upon technical virtuosity at a later stage" (Gissane, 1962).

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