

REVIEW

TRAUMA OF THE ABDOMINAL ORGANS AND RETROPERITONEUM. NEW APPROACHES

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Abstract

The authors present the results of surgical management of polytraumatised patients admitted to the Traumatological Hospital in Brno during the 1988/97 period. They describe different kinds of abdominal injuries, their treatment and outcome. They pay special attention to liver injuries because, in this category, the correct classification of injury may result in conservative treatment and unnecessary laparotomies can be avoided. On the basis of their experience with 700 cases reported here, the authors emphasise the role of laparoscopy in diagnosis and therapy and the use of reconstructive surgery to improve the quality of life in severely injured patients.

Key words

multiple trauma, abdominal organs, retroperitoneum, diagnosis, surgical treatment

TRAUMA CATEGORIES AND METHODS OF TREATMENT

In the Traumatological Hospital in Brno, an average of 200 patients with multiple traumata are treated every year. In a decade of 1988 to 1997, 700 polytraumatised patients who suffered injury to the abdominal region were admitted. Of them, 308 patients underwent surgery for developing haemoperitoneum, 254 for bleeding into the retroperitoneum and 61 for severe thoracoabdominal injuries; traumatic peritonitis due to perforation of the gastrointestinal tract was treated in 77 cases. (6,7,8).

Injury to the liver occurred in 79 patients, of whom six suffered a double rupture; 105 patients underwent surgery for splenic trauma and 23 for injuries to the pancreas. Primary management of traumatic lesions of the duodenum was provided for 11 patients and four patients referred from outside hospitals received secondary care. Injuries to the abdominal vessels and retroperitoneum were diagnosed in 88 cases. Phrenic trauma was surgically treated in 15, trauma to the small intestine and mesenterium in 31, injury to the large intestine in 29 and rectal injuries in 12 patients. Injuries to the upper and lower parts of the urinary tract were treated in 28 and 35 patients, respectively.

The highest number of injured patients fell into the age category of 30 to 40 years. Traffic accidents caused injury in 78%. It was recorded that, in that ten-year period, injuries due to criminal offence increased in number. In the whole group, the mortality rate was 19%, with most of the patients having died due to either severe trauma to the CNS or septic complications

Management of liver trauma depends on the severity of injury. Resection is the method of choice in liver injuries classified as grade IV or V (*Table 1*). A rupture in the central region of the liver is a serious problem and it was treated in five patients (*Fig. 1*). In three of them, it was managed conservatively and healed without other complications. Two patients underwent surgery for massive haemoperitoneum which included resection of a larger part of the liver lobe, ligation of the portobiliary sinuses, tamponage and drainage. They both healed well. In splenic injuries we preferred interventions (*Fig. 2*), including laparoscopy, that preserved the spleen (*1,2,3,4*).

Nine patients after liver trauma, who were transferred from other surgical departments, were reoperated: two for continuing bleeding, four for biliary peritonitis, three for biliary fistula with subfrenic abscess and three for thoracic empyema with sepsis. All the patients healed well after the surgical revision.

Surgical procedures for perforation or avulsion of the gallbladder were performed in 12 patients, for injuries to the common hepatic duct in eight patients and for acute post-traumatic cholecystitis in 45 patients. In patients with trauma to the common hepatic duct, a high Roux hepaticojejunal anastomosis in the Couinaud-Hepp modification was used. The anastomosis was secured by a hepatoenteral drain, as modified by Völker, which remained in place for 16 days. One female patient was referred to our hospital for the fourth reoperation of the hepatic duct due to recurring post-traumatic stricture, septic cholangitis and cholestasis. Since she had severe fibrosis in the porta hepatis, she was treated by a left-side hepaticojejunal anastomosis according to Longmire and Dogliotti. Five years later the anastomosis was still in full function.

Fifteen patients were operated on for duodenal trauma. The following complications occurred: fistula, healed conservatively, in two patients, pancreatitis in three patients and secondary bleeding requiring reoperation in one patient. During reoperations of patients referred from an outside hospital, abscess was demonstrated in two cases and retroperitoneal phlegmona also in two cases. One patient died of multiple organ failure; he was referred to our hospital on the sixth day after duodenal injury in the state of serious sepsis with retroperitoneal phlegmona. Similar complications were reported by Mc Kenney, Nir and Martin from the University of Miami in 1996 (*4,9*), who analysed a group of 40 patients with duodenal trauma. Trauma of the pancreas was surgically treated in 23 patients. The surgical procedures most frequently used were: removal of parts affected by haemorrhagic infarct or otherwise devitalised parts, and derivative

Table 1
Classification of liver trauma according to Moore and Priesching

Grade	Pathological finding
I.	Minute parenchymatous lacerations Subcapsular haematoma
II.	Non-bleeding tears Non-bleeding stab and gunshot wounds
III.	Heavily bleeding tears and wounds Injured segmental veins and bile ducts
IV.	Dilaceration of liver lobes Ruture in the central part of the liver Injury to the porta hepatis
V.	Injury to the hepatic vein trunks or the vena cava



Fig. 1
Rupture of the central region of the liver

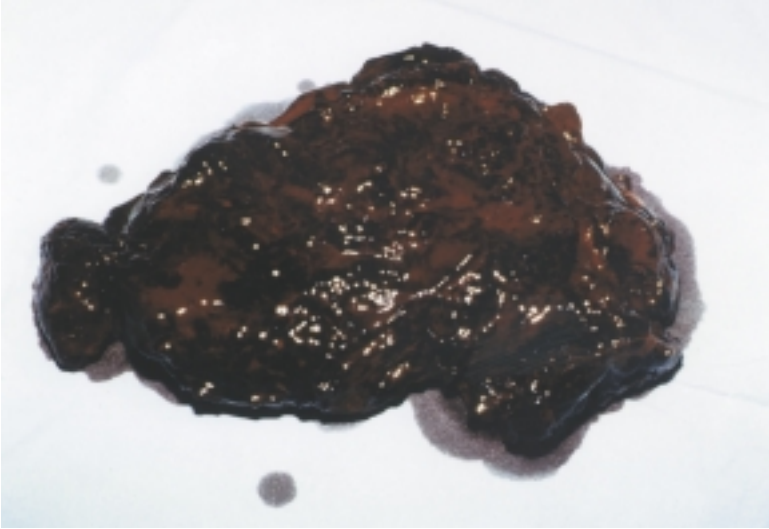


Fig. 2
Splenuetomy after conservative treatment



Fig. 3
Resection in complicated trauma of the small intestine and colon

surgery. Eight patients, who were transferred from other hospitals, were reoperated for sequestration with a left-side subphrenic abscess due to insufficient functional drainage (6,9,10)

In intestinal injuries according to the extent of damage, we preferred the use of primary resection without a stoma (*Fig. 3*). We treated an abscess that developed between loops of the small intestine in two patients and an intestinal fistula also in two cases. If the rectum was injured, after insertion of a terminal stoma and complete drainage of the pelvis, we performed a primary adaptation reconstruction of the rectum and anus. Two patients, initially treated for rectal and anal trauma, who were referred to our hospital after having developed serious anaerobic phlegmona of the perineum, required two months of intensive treatment.

In renal trauma, conservative treatment was preferred and, in indicated cases, reconstructive surgery, which included resection and intervention deep in the renal sinus, was performed. The vascular peduncle and the proximal part of the caval system were always revised carefully. In one patient, the left ureter was found to be torn off 1 cm below the renal pelvis. In two polytraumatised patients, within 24 h of admission, developing thrombosis of the renal vessels was diagnosed by selective renal angiography and then verified intraoperatively by finding subintimal lesions of the renal vessels. Two patients had inflammatory complications manifested as paranephritic abscess following subcapsular haematoma.

In the trauma of the lower urinary tract, especially in multiple pelvic injuries, the primary method of treatment was reconstruction of the urethra and urinary bladder wall. Two patients were reoperated for an abscessing pelvic haematoma and two others were followed up for post-traumatic stricture of the posterior urethra, treated endoscopically by urethrotomy.

Injury to the retroperitoneal arteries and veins was managed surgically in a total of 111 patients who had massive bleeding into the retroperitoneum; surgical procedures were carried out in the pelvic, central and lateral regions in 53, 26 and 32 patients, respectively. Injuries to the aorta, vena cava inferior and vasa ilica rank among the most serious events in traumatology, especially if associated with injury to the spine and/or pelvic ring. This was demonstrated by a number of cases, particularly in the last few years, when patients with these injuries were referred to our hospital in the framework of a research project

DISCUSSION

Diagnosis in polytraumatised patients is based, in addition to medical history and physical examination, on sonographic and CT examinations. In order to speed up the diagnostic procedure, spiral CT has recently been used. Diagnostic and therapeutic laparoscopy is used in unconscious patients and in those with traumatic spinal lesions following unstable spinal fractures. In recent years, these examinations have provided ample evidence that, if the injury is correctly

classified, patients with stabilised circulation who have suffered injuries to the parenchymatous organs, and the liver in particular, can be treated conservatively. A helpful classification system is that designed by Moore and Priesching. It is necessary to reconsider the views, still held by some surgeons, that every haemoperitoneum must immediately be operated on. By correct assessment, we can avoid unnecessary laparotomies in patients who are often in a critical state. Similar conclusions have been made by surgeons from the largest US traumatological centres where, according to *Carilla et al (2)*, more than 45% of injured parenchymatous organs and haemoperitoneum conditions are treated conservatively.

It can be concluded that new, non-invasive techniques, such as spiral CT, enable us to change our views on and methods of treatment in patients with injury to the parenchymatous organs and that, in stabilised patients, more than 45% will be able to undergo conservative treatment by a qualified surgeon (2,3,5). With advancement in endoscopic techniques and minimal invasive surgery, the role of laparoscopy in diagnosis and therapy will increase. The quality of life in severely injured persons will improve if reconstruction and resection procedures are performed at the time of primary operation. In many of the leading surgical departments in the USA, Japan and Germany, the role of embolisation in arresting profuse bleeding, particularly into the retroperitoneum, has been emphasised.

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PORANĚNÍ ORGÁNŮ DUTINY BŘIŠNÍ A RETROPERITONEA – NOVÉ POSTUPY

S o u h r n

V Úrazové nemocnici v Brně přijímáme ročně v průměru 200 polytraumatizovaných pacientů. V diagnostice polytraumatizovaných v současné době v našem ústavu dáváme přednost spirálnímu CT vyšetření nejen pro jeho rychlost, ale i pro exaktní diagnostiku dalších sdružených poranění. V indikovaných případech toto vyšetření doplňujeme diagnostickou laparoskopií, kterou u některých pacientů využijeme k definitivnímu ošetření břišní léze. V desetiletém období autoři operovali 700 pacientů s poraněním orgánů dutiny břišní. Při operačních výkonech autoři upřednostňují výkony rekonstrukční s ohledem na kvalitu života poraněných.

REFERENCES

1. *Blaisdell FW, Trunkey DD.* Management Trauma – Abdominal Trauma. Thieme Stratton New York 1982.
2. *Carilla EH, Platz A, Miller FB, Richardson JD, Plk HC.* Non-operative management of blunt hepatic trauma. *British Journal of Surgery* 1998, 85, 461–468.
3. *Feliciano DV, Patcher HL.* Hepatic trauma revisited. *Curr Probl Surg* 1989; 28: 453–524.
4. *Ivatury RR, Rao R, Cayten GC.* The Textbook of Penetrating Trauma. Williams – Wilkins, Baltimore 1996.

5. *Low R, Duber C, Schweden F, Lehmann L, Blum J, Thelen M.* Whole body spiral CT in primary diagnosis of patients with multiple trauma in emergency situations *Rofo Fortschr Geb Rontgenstr Neuen Bildgeb Verfahr* 1997; 166: 382–8.
6. *Michek J, Zelniček P, Kubačák J.* Peritonitis perforativa posttraumatica Österreich. Gesel. f. Unfallchirurg. Kongress Wien 1995.
7. *Palarčík J.* Letecká záchranná služba – doprava raněných do ÚN v Brně /Airplane ambulance service – transport of injured persons to the Traumatological Hospital n Brno/. *Praktický lékař* 1997;7: 326–328.
8. *Palarčík J.* Timing pánevních operací /Timing of pelvic operations/. *Úrazová chirurgie* 1996; 4: 3–14.
9. *Vokurka J, Wechsler J, Všetíček J, Žák J.* Podmínky k provedení laparoskopické operace /Conditions for laparoscopic procedures/. *Scripta medica* 1994;67:47–50.
10. *Vokurka J, Wechsler J, Kalač J, Mašek M, Vlček P.* Problematika recidivujícího nitrobršního abscesu /Recurrent intra-abdominal abscesses/. *Sborník 48.dne Kostlivého* 1994, Bratislava.
11. *Waczlawiczek HW, Schneeberger V, Bekk A.* Value of diagnostic laparoscopy and minimal invasive procedures in acute abdomen. *Zentralbl. Chir.* 1997;122: 108–12.