Technical report

Simple method for necropsy dissection of the abdominal organs after abdominal surgery

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Abstract

This paper illustrates a simple method of necropsy dissection of the abdominal organs after abdominal surgery. The organs are removed in one block as per the method described by Letulle. A retroperitoneal approach is then used. Structures are dissected away in a series of layers using the vasculature for guidance. This technique permits the examination of important structures in the postoperative abdomen which would otherwise be extremely difficult and time consuming using conventional methods. The anatomy is demonstrated without being obscured by the contents of the peritoneal cavity.

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The role of the hospital necropsy has been subject to recent debate¹⁻⁴ and the rate of necropsy continues to decline.⁵ However, there

is increasing demand for high quality postmortem examinations as a part of both local and national audit and medicolegal procedures.⁶ In this regard, the National Confidential Enquiry into Postoperative Deaths (NCEPOD) has highlighted deficiencies in necropsy reports in a percentage of cases.⁵ The NCEPOD report recognises that properly performed necropsy examinations can produce new and clinically valuable information. The findings in such necropsies also have considerable medicolegal importance in the face of increasing litigation.

The classic descriptions of the dissection of the intra-abdominal organs pay little attention to the difficulties which may be encountered in the abdomen of a postoperative patient.⁷⁻⁹ The problems encountered include extensive recent or old adhesions and the effects of carcinomatosis peritonei, purulent, biliary or faecal peritonitis. One method described for dealing with a case in which there are extensive abdominal adhesions, particularly between intestinal loops, is en bloc removal and fixation of the abdominal organs involved and then subse-

Figure 1 Anterior aspect of abdominal viscera which are removed en bloc. The surgical forcepts mark a colostomy. All the figures are orientated with the cranial aspect of the organ block at the top of the figure.

Figure 2 Retroperitoneal aspect of the abdominal block showing the aorta (arrowhead) and inferior vena cava (arrow).

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Figure 3 The opened inferior vena cava and iliac veins, the right renal artery having been divided.

quent cutting of serial sections through the entire organ block.¹⁰ This technique does not permit accurate demonstration of the anatomical relations of lesions and does not facilitate the examination of important structures, such as the arterial tree and portal venous system. It is the practice of many experienced pathologists to perform as much dissection as possible from the retroperitoneum in these cases, but these techniques are not described in current textbooks of necropsy technique¹¹⁻¹⁴ and are not available for study by less experienced pathologists.

Here, we describe and illustrate the techniques which we have used in such difficult

Figure 4 The intimal aspect of the abdominal aorta and common iliac arteries showing the relation of the ureters to the iliac vessels.

Figure 5 The portal vein entering the porta hepatis. A tube is inserted into the splenic vein.

cases and which have allowed us to reach conclusions which might not have been otherwise ascertained using the standard necropsy methods of dissection of the abdominal contents.

Methods

The body is opened using a standard midline incision, which may be continued into the neck, upper limbs or groin as indicated. The thoracoabdominal viscera are removed en bloc according to the Letulle method,⁹ leaving the large and small bowel mass attached. Cutaneous perforations, enterostomies or colostomies are dissected and clamps are attached to facilitate identification during the dissection (fig 1). The organ block is placed with the anterior aspect downwards on a dissection table. The oesophagus is opened along its posterior aspect, detached from the pharynx and dissected from the trachea. The oesophagus may be left attached to the stomach at the level of the diaphragm or, alternatively, inverted and inserted into the stomach. This later approach facilitates the examination of varices in the lower oesophagus and lesions of the gastro-oesophageal junction. Cross-clamping or inversion of the oesophagus also prevents leakage of the gastric contents. The thoracic organs may be examined in continuity with the abdominal block or detached and dissected separately.

The abdominal organ block is dissected from the posterior aspect. Initially, the aorta and inferior vena cava are identified (fig 2). Either vessel may be opened first. If the inferior vena cava is dissected first (fig 3), opening this vessel requires transection of the right renal artery, which may be cross-clamped for further identification. After examination the inferior vena cava may be dissected free and discarded.

The abdominal aorta is then opened (fig 4). The ostia of the coeliac, mesenteric and renal branches are examined. The adrenal glands,

Figure 6 Dissection of the splenic vein.

Figure 7 The common hepatic artery (arrowhead) showing its relation to the common bile duct (arrow). A tube is inserted into the cystic duct.

Figure 8 The pancreatic duct (arrows) opened from the posterior aspect.

Figure 9 The superior mesenteric artery showing branches running in the folds of the mesentery.

kidneys and ureters are then examined and dissected free. The kidneys and ureters may be left attached to the bladder by reflecting them over the iliac vessels.

The portal venous system may now be identified by dissection of the porta hepatis (fig 5) and examined for tumour involvement or thrombi. The splenic vein is opened (fig 6) and the spleen removed for further examination. The common hepatic artery can be traced from the coeliac axis (fig 7) and similarly the splenic artery may be identified. The relation of the biliary tree to the hepatic artery can be

Figure 10 The oesophagus (oe), stomach (s) and duodenum (d) opened in continuity from the posterior aspect.

Figure 11 The folds of the mesentery showing multiple foci of secondary haemorrhage.

demonstrated and the biliary tree may be opened in its entirety. Similarly, the pancreatic duct may be opened and displayed and the pancreas examined (fig 8). Returning to the aorta, the superior mesenteric artery is identified from its ostium and is dissected to reveal the major branches running into the mesentery (fig 9).

Having dissected the intra-abdominal vasculature and the hepatobiliary system, the oesophagus, stomach and duodenum may now be opened and examined from the posterior aspect (fig 10). Removal of these organs leaves the matted bowel which is first examined externally for signs of perforation. The folds of the mesentery can be examined for abscess formation (fig 11). The extent of the further examination of the bowel is dependent on the nature of the intra-abdominal pathology. The colon may be expanded by the introduction of running water under moderate pressure and this may facilitate its opening. Similarly, the small bowel may be opened in situ. In cases of dense fibrous adhesions, the matted bowel may be examined by making multiple slices. If it is possible to make these slices in the coronal plane, these often reveal more useful information than slices in the transverse plane.

Discussion

We have found that this method concentrates the examination on critical structures, such as

the intra-abdominal vasculature and hepatobiliary system, the detail of which is often difficult to ascertain by dissection of the viscera from the classic anterior approach. In particular, we have found the exposure of the porta hepatis and its structures to be extremely useful in postoperative cases, where we have demonstrated abnormalities such as hepatic artery thrombosis and leakage from the biliary tree. Good anatomical exposure in this site is of particular value in deaths after laparoscopic surgery.

The retroperitoneal structures are dissected away in a series of layers that permits clear demonstration of the anatomy without the detail being obscured by the contents of the peritoneal cavity. The time taken to perform the dissection in this method is less than that required to struggle through separating the intra-abdominal viscera in order to expose the hepatobiliary system and vasculature from the anterior aspect. The structures which are revealed may be identified readily and demonstrated to clinical colleagues. The exposure also permits the preparation of a clear and unambiguous photographic record which may be of value in subsequent medicolegal proceedings.

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