ABDOMINAL DRAINAGE AFTER ELECTIVE LIVER RESECTION

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The discovery and introduction of abdominal drainage was a milestone in the development of abdominal surgery. Drainage facilitated site control, which led to considerable reduction of mortality caused by intra-abdominal infections and bleeding.

In recent years, with the development of modern antibiotic treatment and progress in surgical techniques, a trend has emerged toward discontinuing extensive drainage of the peritoneal cavity, which results in a limited number of drains left in the patient's abdomen. Experiments and clinical experience confirm the safety of this procedure.

In 1991, Monson published research findings indicating that patients with drainage of the abdominal cavity following cholecystectomy developed the subhepatic fluid collection more often than patients without drainage (1). Similarly, authors of a study into other abdominal surgical procedures failed to demonstrate any advantages of drainage (2).

The first studies describing Whipple's pankraduodenectomies that were not followed by drainage were published early in the 1990s (3). Also, works describing the issue of drainage in patients after liver resection appeared in those years. They indicate a statistically insignificant number of postoperative complications in patients without drainage, and they present findings showing greater incidence of intra-abdominal fluid collection with abdominal drainage (4).

During elective liver resections, drains are inserted close to the site (usually in the subphrenic and subhepatic areas). This location enables the control of ascites, bleeding, and possible bile leakage. Unless there are other reasons for the drains to be left in place, they are usually removed 2-3 days after the surgery.

Despite the surgical logic of continued drainage after liver resection, this procedure is now challenged ever more often, and the issue of abdominal drainage often recurs in medical literature (5).

The first studies showing the safety of resection without subsequent drainage of the peritoneal cavity in patients with a healthy liver were published in the 1990s. However, patients with liver cirrhosis, decreased production of clotting factor, collateral vessels and circulation, as well as ascites were left out of such studies.

In 2004, Annals of Surgery published an article by a group of Hong Kong surgeons who studied postoperative abdominal drainage following liver resection in patients with cirrhosis (6). The sample was randomly divided into patients with and without drainage. The largest resection performed was trisegmentectomy. In both groups of patients, 15 factors were analyzed; including age, prothrombin time, albumin concentration, bilirubin concentration, the TNM scale, alphafetoprotein (AFP) concentration, size of resection, blood loss and transfusion, and drainage of the peritoneal cavity. The drainage, combined with the extent of liver resection and intraoperative blood loss in excess of 1.5 liters, were identified as independent factors significantly influencing the number of postoperative complications.

The additional role of drainage in liver surgery is to control the discharge of ascitic fluid.
Increased production of ascitic fluid is a frequent “complication” following resection of a cirrhotic liver (7). This response of the liver is primarily related to the nature of cirrhosis, but it is also related to a loss of functional parenchyma during resection and ischemic injury caused by reduced blood flow during liver resection.

The surgical procedure additionally causes a secondary increase of the production of ascitic fluid. Also, the risk of intraperitoneal bleeding grows considerably. On the one hand, this is due to the dysfunction of the coagulation system in such patients; on the other hand, it is due to portal hypertension, splenomegaly, and the resulting thrombocytopenia that accompanies cirrhosis. Besides, the intraoperative ligation of collateral vessels increases the risk of bleeding from such vessels and intensifies the production of ascitic fluid. In such circumstances, most surgeons apply drainage.

The moment when drainage should be discontinued often gives rise to doubts in the case of cirrhotic patients. Should the drains be removed if the drained fluid is scarce? Moreover, what amount of the fluid may be considered insignificant? Finally, the most important question is how long after the surgery should the drain be removed: as soon as possible or as late as possible?

Drainage itself is not a completely safe procedure and involves the risk of mechanical damage the the intestines, increased probability of wound infection, and a greatly extended period of hospitalization (8). After liver resection, cirrhotic patients are at a greater risk of abdominal infections, which may progress in an atypical way. The first clinical symptoms often include signs of liver decomposition, such as increase of encephalopathy, growing ascites and jaundice. Drainage in such patients may well produce results contrary to the expected ones.

Based on experience from the King’s College Hospital in London, where the present author worked, there is a noticeable trend towards limiting the number of drains to the necessary minimum. During elective extended liver resection, that number is reduced to one drain at most; liver transplantation from deceased donors involves not more than two drains.

The rules of inserting as few drains as possible and of their removal as soon as possible (on the first or second day following the surgery) were observed rigorously. With smaller resections, drainage is only applied if the surgeon has doubts as to hemostasis. The surgeons of King’s College see the drainage of ascitic fluid as an opportunity for infection and the volume of drained fluid of negligible benefit for further treatment.

In cirrhotic patients after liver resection with large volumes of ascitic fluid drained, the drains were removed as soon as possible after the surgery if the risk of active abdominal bleeding could be excluded. At the same time, intense treatment with large doses of intravenously administered diuretics was ordered.

As at the King’s College, standard procedure at the Department of General, Transplant and Liver Surgery, Medical University in Warsaw, is to limit drainage to the necessary minimum following liver surgery. Following resections of one or two segments, irrespective of the morphology of the liver, the no-drain procedure is preferred. The prerequisite of such procedure is complete hemostasis, especially in patients with cirrhosis. The trend towards limiting drainage is also noticeable in the case of patients after liver transplantation, where the maximum number of drains was decreased to three. Following extended liver resections involving more than three segments, two drains are used and removed during the first few days after the surgery.

In cirrhotic patients, where the ascitic content is drained, it is the generally accepted procedure both at the Department of General, Transplant and Liver Surgery and at the King’s College to remove the drains earlier and then to launch intense subsequent treatment with diuretics.

There are but a few well documented studies into the issue of drainage of the peritoneal cavity, either confirming or negating the need for such drainage; the many decades’ practice of inserting the drains is, in itself, insufficient scientific justification.

The abdominal drainage after surgery within the abdomen remains a controversial issue that requires further study. One of the latest contributions to the discussion is a study published in “Hepatogastroenterology” in 2004. Its findings suggest usefulness of drainage following liver resections due to HCC in cirrhotic patients (9). It is worth stressing at this point that no data are available that suggest that a drain within the site of liver after mali-
Abdominal drainage after elective liver resection might lead to dissemination of the neoplastic process.

In view of the small number of complications after liver resections carried out today and the progress in liver surgery, one might argue that we are now witnessing a trend of reducing the number of drains or eliminating them altogether.

REFERENCES


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