Evaluation of complications that arise after hepatectomies by MDCT

Poster No.: C-0567
Congress: ECR 2012
Type: Educational Exhibit
Authors: A. Riaguas Almenara, L. Sarría Octavio de Toledo; Zaragoza/ES
DOI: 10.1594/ecr2012/C-0567

Any information contained in this pdf file is automatically generated from digital material submitted to EPOS by third parties in the form of scientific presentations. References to any names, marks, products, or services of third parties or hypertext links to third-party sites or information are provided solely as a convenience to you and do not in any way constitute or imply ECR’s endorsement, sponsorship or recommendation of the third party, information, product or service. ECR is not responsible for the content of these pages and does not make any representations regarding the content or accuracy of material in this file.
As per copyright regulations, any unauthorised use of the material or parts thereof as well as commercial reproduction or multiple distribution by any traditional or electronically based reproduction/publication method ist strictly prohibited.
You agree to defend, indemnify, and hold ECR harmless from and against any and all claims, damages, costs, and expenses, including attorneys' fees, arising from or related to your use of these pages.
Please note: Links to movies, ppt slideshows and any other multimedia files are not available in the pdf version of presentations.
www.myESR.org
Learning objectives

Review of complications after liver resection surgery and to determine their MDCT imaging findings.
Background

Hepatic resection is widely accepted as the best treatment for localized hepatocellular carcinoma (HCC), liver metastases. A variety of liver resections can be performed. These include resection of an entire lobe (right or left), more than one lobe (extended lobectomy), or segmental resection (part of a lobe). These resections are based on the eight anatomical segments of the liver.

Patients are monitored periodically with MDCT, for detection of metastases or postoperative recurrence of HCC.

Considerable progress has been made in many areas of liver surgery, including the availability of novel methods to preoperatively evaluate tumor and liver volumes, novel operative techniques, and an optimization of postoperative management. With these advances in surgical techniques and perioperative management, in-hospital mortality and morbidity, in consequence of liver resection, have greatly improved.

Surgical technique could be quite complex, in particular in those patients either affected by cirrhosis or large HCC, but several technical advances have contributed to lower intra and postoperative risks. Notwithstanding technical advances and high experience of liver resection of specialized centers, the rate of complications after surgical resection could be high.

On the other hand, the liver is the most common site of distant metastasis and nearly half of the patients with colorectal cancer ultimately develop liver involvement during the course of their diseases. Treatment of primary colorectal cancer with surgical resection, combined with chemotherapy and radiotherapy in some cases, is effective in many patients.

On the contrary, about 10-25% patients had liver metastasis at the time of primary diagnosis and another 20-25% patients developed metachronous liver metastasis.

Patients without extrahepatic diseases and with good liver function and general condition are candidates for surgical resection of liver metastasis; the operative mortality for major liver resections has declined with improved operative techniques and postoperative care, but still significant. Operative mortality ranged from 0 to 7%. The causes of death include bleeding, sepsis, and liver failure.
Pleural effusion, ascites, wound and chest infection, subphrenic abscess, biliary fistula and hepatic insufficiency are frequent complications after liver resection. In spite of careful selection of patients eligible for resection and advances in surgical techniques and perioperative management that have greatly contributed to lowering the rate of perioperative deaths, stress must be placed on reducing the postoperative complication rates reported to be still as high as 50%.

As recently reported in the literature, there is a relationship between postoperative mortality and the presence of cirrhosis with a higher mortality rate both in alcohol abuse and patients affected by viral hepatitis B.

Postoperative hepatic failure or temporary impairment liver function are the most serious complications which can occur after liver resection, in particular in cirrhotic liver: as claimed by the literature, postoperative hepatic failure, which is mainly preceded by insufficient remnant liver function, massive intraoperative bleeding followed by massive transfusion, and or postoperative septic complication, is the major cause of hospital mortality.

The debate about the extension of liver resection for Hcc on cirrhosis is already open and it ranges from the widest resection to obtain radical results to the limited procedure aimed at prevention of worsening liver function. Recent studies revealed that a liver remnant volume lesser than 25% is associated with an increased incidence of postoperative hepatic dysfunction in patients with normal liver, but liver resection on cirrhosis must conserve about 50% of total liver volume to preserve liver function.

Improvements in surgical management including the use of modern devices, such as ultrasonic dissector, reduction in blood loss and blood transfusion, intermittent warm ischemia, maintenance of a low central venous pressure during hepatic transection, and shortening the procedure length have made considerable contributions to safer procedure and improved outcomes, specially in lowering postoperative complication.

Parenchymal transection is the most important stage of liver resection. The majority of intraoperative complications that affect patient outcome occur during this procedure.

Many efforts have focused on achieving safe liver transection by designing the proper transection plane and developing techniques that enable performance of liver parenchymal splitting in a bloodless surgical field.

Intraoperative bleeding is always one of the key problems in liver surgery. It has been demonstrated that massive hemorrhage during partial hepatectomy contributes to
morbidity and mortality. Besides, subsequent blood transfusion facilitates the recurrence of hepatic malignancies, including both primary and secondary tumors, and decreases the survival of patients. Thus, control of intraoperative hemorrhage appeared to be very important in hepatic resection.

As a frequent complication after hepatectomy, pleural effusion mainly affects the right liver lobe with a high incidence in hilar cholangiocarcinoma.

During hepatectomy, conventional mobilization of the liver involves mechanical division of its ligamenous attachments and hemostasis with suture ligation, which usually results in damage to the integrity of the lymphatic circumfluence. Compared with left hepatectomy, right hepatectomy entails extended division that causes more damage to the lymphatic pathway; thereby more postoperative pleural effusion occurs. Thus, to reduce the incidence of postoperative pleural effusion, it is necessary to control the division before hepatectomy. When moderate or more ascites develops postoperatively, the elevated intra-abdominal pressure expels the ascites into the thorax through the damaged diaphragm and adds to pleural effusion.

The incidence of biliary leakage in liver resection without biliary reconstruction is 4%-12%. These are generally self-limiting, unless a distal stricture of the biliary tree is present.

Differences in the frequency in relation to the extent of the liver resection were not found. The difference in the incidence of bile leakage in patients with or without liver cirrhosis is not significant.

Preoperative and operative factors associated with the development of biliary complications are age, preoperative white blood cell count, left-sided hepatectomy, high-risk procedure, operation time and intraoperative blood loss.

The intraoperative bile leakage test cannot exclude the possibility of postoperative bile leakage because damage to the bile ducts of a small segregated segment of the liver may continue to cause bile leakage without communication with the main biliary tree.

The amount of bile leakage from the bile ducts of a small segregated segment of the liver can be small, and the site of bile leakage can close spontaneously in the short term.

The relatively high incidence of uncontrollable leakage in patients after right-sided hepatectomy might be related to the pumping action of the right hemidiaphragm.
The mortality of biliary leakage is around 6.5%.

The results of non-operative management of bile leakage after liver transplantation and other hepatobiliary procedures are encouraging, and non-surgical measures have become the preferred approach.

Subphrenic collections or abscesses: The presence of bile, blood, and devitalized tissue in the dead space after hepatic resection provides the ideal environment for bacterial growth. The combination of a sudden reduction in the liver volume and development of intraperitoneal sepsis frequently results in liver failure, which has a bad prognosis.
Imaging findings OR Procedure details

In our hospital, 163 hepatectomized patients were reviewed. We have identified the main complications and their detection by MDCT. Of our 163 patients, 50 of them presented complications (31%). *(Figures 1-9).*
Fig. 1

© Hospital Miguel Servet - Zaragoza/ES
Fluid collection that contains gas (arrow), suggestive of abscess.

In the same patient, there is a collection with gas, in the VII segmentectomy, suggestive of abscess (arrow). Right pleural effusion (asterisk).

Fig. 2

© Hospital Miguel Servet - Zaragoza/ES
LEFT HEPATIC LOBECTOMY AND RESECTION OF METASTASES of the right lobe from colorectal cancer

Fluid collection that containing gas (arrow), suggestive of abscess.

Fig. 3

© Hospital Miguel Servet - Zaragoza/ES
IVb AND V SEGMENTECTOMY with resection of the main bile duct for intrahepatic cholangiocarcinoma.

Collection and moderate amount of perihepatic ascites (↑).
Hypodense lesion (↑) in segment V for the surgery.
In the postoperative period, the patient was a biliary leakage.

Fig. 4

© Hospital Miguel Servet - Zaragoza/ES
LEFT HEPATIC LOBECTOMY AND RESECTION OF METASTASES of the right lobe from cholangiocarcinoma.

Presence of collections / hematomas in the liver (*), without signs of superinfection.

Fig. 5
© Hospital Miguel Servet - Zaragoza/ES
VI AND VII SEGMENTECTOMY and resection of tumor with portal vein reconstruction.

Collection ( * ) and ascites (↑). Right pleural effusion(↑).

Fig. 6

© Hospital Miguel Servet - Zaragoza/ES
LEFT HEPATIC LOBECTOMY AND RESECTION OF METASTASES
the right lobe from cholangiocarcinoma.

Fig. 7

© Hospital Miguel Servet - Zaragoza/ES
Fig. 8

© Hospital Miguel Servet - Zaragoza/ES
RIGHT HEPATECTOMY for metastases from breast cancer.

The patient had abdominal pain and alteration of the descending colon wall may be seen, suggestive of ischemic colitis.

Fig. 9

© Hospital Miguel Servet - Zaragoza/ES
Conclusion

MDCT is a great tool for diagnosis and screening of postoperative complications after hepatic resection and for their subsequent control.
Personal Information

The names and order of the authors are:
Ana Riaguas Almenara, Luis Sarria Octavio de Toledo.
References


