



Hepatectomy in children: 10 year experience in a tertiary care hospital.

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ABSTRACT

Background: Hepatectomy can be safely performed in children with primary liver tumours, selected cases of metastatic tumours and traumatic liver injuries. However liver resections are associated significant morbidity and mortality even in advanced centres. The aim of this study was to evaluate the outcome of liver resections over a period of 10 years. **Material and Methods:** This was a prospective study of patients who underwent various types of hepatectomies for different indications from March 2005 to April 2015. **Results:** 15 patients underwent liver resections during the study period. The age of patients ranged from 8 months to 14 years with mean age of 3.7 years. The indications were hepatoblastoma in 9 patients, traumatic liver injury in 3 patients, abscess, liver extension of right wilms tumour and extension of left neuroblastoma to liver in 1 patient each. Right and left hepatectomies were done in 8 (54.4%) and 5 (33.3%) patients respectively. Nonanatomic/ wedge resection was done in 2 (13.3%) patients. Haemorrhage which needed transfusion occurred in 4 (26.7%) patients, bile leak in 1 (6.7%), wound infection in 1 (6.7%) and death in 1 (6.7%) patient. **Conclusion:** Liver resection in children can be safely performed with minimal morbidity and mortality. Better results can be achieved with good perioperative care, vigilant identification and good expertise in the management of complications.

KEYWORDS

Hepatectomy. Children. Outcome.

Introduction

The first liver resection was done by J.C Massie in 1852 in a child, who sustained a gunshot injury with herniation of his right lobe of liver. Until the second half of the 20th century, liver resections were mainly performed for either injuries or infections. Today, hepatectomies have also been widely performed for benign and malignant liver tumours, hydatid disease, abscess, calculi in the intrahepatic ducts [1-5]. Liver resection is challenging, because of its vascularity, anatomic architecture and vital functions. Despite the improvement in surgical techniques, experience and postoperative care, there is still high postoperative morbidity (4% - 47.7%) and mortality (0.2% - 9.7%) [6-10].

Hepatic resections are complex operations that require vigilant care both inside and outside the operating room. However, in the absence of underlying liver disease, as much as 85% of the liver parenchyma can be removed with minimal morbidity and mortality [11]. The hepatic regeneration is remarkable and most of the patients will have a normal liver volume within three months of liver resection.

Preoperative assessment and identification of risk factors, hepatic functional reserve and the volume of the remaining functional parenchyma is important for the post hepatectomy morbidity and mortality [12]. Post hepatectomy complications including, haemorrhage, fever, bile leak, liver failure, pleural effusion, sub phrenic abscess, wound infection and coagulation disorders. Morbidity and mortality can be prevented, if the surgeon has comprehensive knowledge of the expected complications and expertise in their management. The aim of this study was to evaluate the outcome of hepatectomy in children for the last 10 years in a tertiary care hospital.

Material and Methods

This was a prospective study from March 2005 to April 2015 conducted in the department of Pediatric Surgery, Sher-I-Kashmir Institute of Medical Science, Srinagar, India. Patients with various liver lesions including, malignant liver tumour, traumatic liver injury, abscess, hydatid disease and metastasis or non-hepatic tumour extension to the liver were included in the study. Various types of hepatectomies were done and post hepatectomy outcome was assessed and analysed. The outcome was assessed in terms of haemorrhage requiring transfusion or re-exploration, bile leak, hepatic insufficiency, wound infection and death of the patient.

Results

Different types of liver resections were done in 15 patients with different indications. The age of patients ranged from 8 months to 14 years with mean age of 3.7 years. 13 (86.7%) patients had anatomic resection and 2 (13.3%) patients had non anatomic/wedge resection. The indications for hepatectomies are shown in [table -1]. Non anatomic resection was done in two patients to obtain negative margin. The various types of hepatectomies and post hepatectomy outcome are shown in table -2 and table-3 respectively.

Discussion

Hepatectomy in children is somewhat easier than adults, regarding exposure, mobilization of liver, elasticity of the surrounding organs. However, even small volume of blood loss can cause shock which will increase morbidity and mortality. Therefore there should be precise inflow control, out flow control, precise monitoring and accurate blood replacement.

Hepatectomies may be anatomic in which plane of resection matches the limits of functional segments of the liver as defined by the Couinaud or they may be non-anatomic/wedge hepatectomies. Anatomic resections are generally preferred because of the less risk of bleeding and biliary fistula.

Liver resection remains the procedure of choice for the management of primary liver tumors despite the advances in chemoembolization and cryosurgery and other modalities [13]. For the metastatic liver tumor, hepatectomy is the mainstay treatment in selected patients [14].

Liver dissections are associated with high morbidity and mortality. There is wide range in the reported incidence of morbidity, ranged for 16.2% to 81%, [15-17]. This wide range is due to the heterogeneity of the published series, differences in indications, extension of hepatectomy, percentage of patients with underlying liver disease, perioperative care and expertise in the management of complications. With the improvement in the anaesthetic and surgical technique and perioperative care, the operative mortality in the recent decade ranges from 0-3% [18]. In our patients, the mortality was 6.7% which is similar to the mortality rate reported by other centers, although few highly specialized centers have reported zero mortality [19-21]. The morbidity was 40% in our study, which is almost similar to the percentage reported by other authors [15-17]. Fatal complications

including bile leak with intra-abdominal sepsis occurred in 6.7% of patients, which is similar to reported by other authors from major international centers, for example, 6.9% by Miyagawa et al [22] and 3% by Lai et al [23].

Blood transfusion has been associated with postoperative morbidity and mortality, tumour recurrence and is a major risk factor for poor outcome after liver resections [24-29]. Several factors may reduce operative haemorrhage and hence transfusion and its associated morbidity and mortality. Tumour shrinkage by neoadjuvant chemotherapy, awareness of segmental anatomy, inflow and outflow control on vessels, low central venous pressure (CVP) and use of ultrasonic dissector. In our patients, we transfused blood in 4 (26.7%) patients, 3 traumatic patients and 1 hepatoblastoma patient. So this high rate of transfusion in our patients is because of more percentage of traumatic patients which needed transfusion.

Bile leak is another concern after hepatectomy. In our study, bile leak occurred in 6.7% of patients, which is similar to reported from other centers. Tanaka et al [30] and Lam et al [31] have reported bile leakage of 7.2% and 5.5% respectively.

Out of 15 patients, 14 patients are in our follow-up and are doing well without any symptoms with longest follow-up of 10 years. One patient had recurrence of the tumor and died after three months of surgery.

Conclusion

Liver resection in children can be performed safely with minimal morbidity and mortality. With meticulous surgical technique, awareness of segmental anatomy, low central venous pressure, good inflow and outflow control on major vessels and neoadjuvant chemotherapy, decrease the bleeding and hence transfusion and its associated risks. Better perioperative care with the vigilant identification and good expertise in the management of complications is important and which led to impressive results.

Tables

Table -1: Indications of liver resection

Indication	Frequency	Percentage (%)
Hepatoblastoma	9	60
Traumatic liver injury	3	20
Abscess	1	6.7
Tumour of non hepatic origin with extension to liver	2	13.3
Total	15	100.0

Table -2: Types of liver resection

Operative procedure	Frequency	Percentage (%)
Right hepatectomy	8	53.4
Left hepatectomy	5	33.3
Non anatomic/wedge resection	2	13.3
Total	15	100.0

Table -3: Outcome

Variable	Frequency	Percentage (%)
Hemorrhage required transfusion	4	26.7
Bile leak	1	6.7
Wound infection	1	6.7
Death	1	6.7
Total	7	46.8

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