Section: Miscellaneous

Original Research Article

EVALUATION OF HEPATIC STEATOSIS AS A RISK FACTOR FOR POSTOPERATIVE OUTCOMES AFTER PARTIAL HEPATECTOMY

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Abstract

Background: Hepatic Resections Are Being Frequently Performed For Several Benign And Malignant Liver Conditions. The Outcome of Partial Hepatectomies Is Influenced by Several Factors Including Cirrhosis, Cholestasis, Remnant Liver Volume, And Hepatic Steatosis. With the mounting prevalence and already known predisposition of hepatic steatosis for chronic liver disease, it becomes vital to study the impact of hepatic steatosis in hepatectomies. The study aimed to correlate the impact of hepatic steatosis on post-hepatectomy outcomes including Duration of surgical procedure, Intraoperative blood loss, Duration of hospital stay, Post-operative complications, and Mortality. **Materials and Methods:** This Is an open-labelled prospective Study of Patients undergoing hepatic resections for Various Indications. A Liver Biopsy Was Taken from The Remnant Lobe to Assess the Grade of Steatosis and the Peri-Operative Course of the Patient Was Recorded Concerning the objectives. Later The Same Was Correlated with The Steatotic Grade as Per The Final Histopathological Report. **Result:** On analyzing the results of our study, males predominated the sample constituting 73% of the total subjects. The mean age of our study population was 51.3 yrs. The most common Etiology responsible for partial hepatectomy was malignant hepatic neoplasm (74%). The mixed variety of steatosis was the most common (70%). Mild steatosis was the commonest grade in both major (63.15%) and minor (90.9%) hepatectomy group. There was no statistically significant difference about the grade of steatosis and surgical duration, duration of ICU stay in both major and minor hepatectomy group. **Conclusion:** Hepatic steatosis based on a univariate analysis has no significant impact on the postoperative` complications after partial hepatectomy.

INTRODUCTION

Obesity has become a rapidly progressing epidemic in recent years.[1] As per the WHO 2016 worldwide data, more than 1.9 billion adults aged 18 years and older were overweight. Of these over 650 million adults were obese.[2] India, with over 1.5 billion people is the first most populous country in the world and is currently experiencing rapid epidemiological transition. The prevalence of generalized and abdominal obesity in urban and rural India based on phase 1 of the Indian Council of Medical Research - India Diabetes (ICMR INDIA B) study showed that nearly 135 million population are obese.[3,4]

The constellation of the hepatic manifestation of metabolic syndrome includes hepatic steatosis, Steatohepatitis, fibrosis, and cirrhosis.[5,6]

Hepatic steatosis which is the earliest phase of the pathogenesis of chronic liver disease has been broadly classified into alcoholic fatty liver disease (AFLD) and Non-alcoholic fatty liver disease (NAFLD) by Reid and Ramesh Classification based on the Etiology.[7] Hepatic steatosis is the most common cause of chronic liver disease with an estimated prevalence of 52% and alcoholic liver

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disease accounting for 21% cases of chronic liver disease in a multi-ethnic study in the United States.[8] With the increasing obesity in Asians and Indians, the scenario is no different, the prevalence of non-alcoholic fatty liver diseases in South India is 32% which amounts to a massive one-third of the population.[9] Unlike the well-established surgical principles of hepatic resections in cirrhotic livers, the same has not been demarcated in steatotic livers despite its prevalence being so prominent.[10]

MATERIALS AND METHODS

This was a prospective cohort study including a total of 35 patients who presented to the Department of Surgical Gastroenterology & Liver Transplantation, BMC & RI during our study period from November 2015 to December 2017.

Inclusion criteria

1. Primary liver malignancies.
2. Benign liver lesions.
3. Liver metastases in colorectal malignancies.
4. Primary biliary tumors
5. Recurrent pyogenic cholangitis.

Exclusion criteria:

1. Liver resections done in livers with cirrhosis, and cholestasis.
2. Hepatic resections done for liver trauma.
3. Post-embolization of portal veins

Statistical analysis:

Statistical software: the statistical software namely SAS 9.2, SPSS 15.0, STATA 10.1, MEDCALC 9.0.1, SYSTAT 12.0 and r Environment ver.2.11.1 were used for the analysis of the data, and Microsoft Word and excel have been used to generate graphs, tables etc.

RESULTS

The average age of the study population was 50.5 yrs (fig 1). In our study males contributed 74% (26) and females 26 % (fig 2). Of the study population 2 (5.71%) of the subjects were diabetics, 4 (11.42%) were hypertensive and 2 (5.71%) were both diabetic and hypertensive.

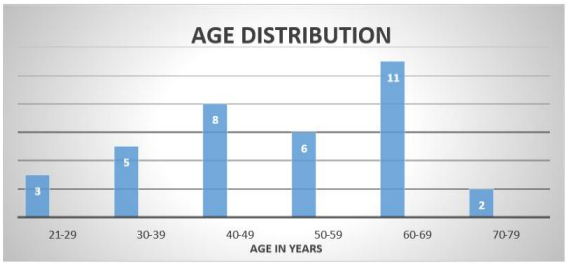

Figure 1: Age distribution of the subjects

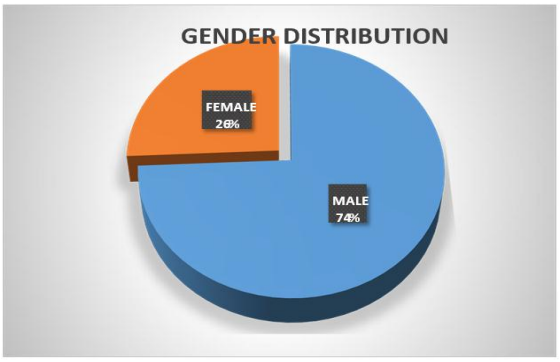

Figure 2: Sex distribution of the subjects

The subjects with mild steatosis dominated the study 24 (68.57%) and marked steatosis were 11 (31.4%) (table 1).

In the mild steatosis group 9 (37.5%) had history of alcohol addiction and 15(62.5%) were non alcoholics. In the marked steatosis group 8(72.7%) were alcoholics compared to 3 (27.27%) who were non alcoholics (p = 0.05290).

In the mild steatosis group 16 (66.66%) were non obese and 8(33.33%) were obese. In the marked steatosis group 3 (27.27%) were non obese and 8 (72.27%) were obese (p = 0.0298) (table 2).

In the mild steatosis group, 16 (66.66%) had dyslipidemia and 8(33.33%) had normal lipid profiles. In the marked steatosis group, 8 (72.72%) had dyslipidemia and 3 (27.27%) had normal lipid profiles (p = 0.7199). There was no statistically significant correlation between dyslipidemia and grade of steatosis.

In our study population undergoing major hepatectomy, 13 (62%) subjects had mild steatosis, 8 (38%) had marked steatosis and in the population undergoing minor hepatectomy, 11 (79%) subjects had mild steatosis, and 3 (21%) had marked steatosis.

The most common variety of steatosis was mixed variety 62.85%, followed by macrovesicular 22.85%. The micro vesicular variety was the least common type 14.2% (Fig 3).

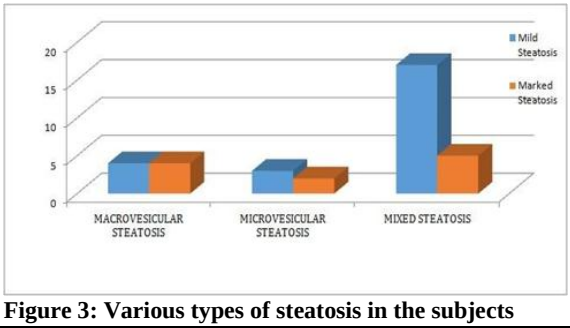

Figure 3: Various types of steatosis in the subjects

The average time taken for the completion of a major hepatectomy was 6.9 hrs. The time duration in marked steatosis group was slightly higher. The average time for major hepatectomy in the mild steatosis group was 6.83 hrs and in the marked steatosis group was 7 hours (p-value = 0.3636).

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The average time duration for minor hepatectomy was 5.64 hrs. The average time for minor hepatectomy in the mild steatosis group was 4.83 hrs and in the marked steatosis group was 5.86 hrs. p value = 0.1387.

The average blood loss for major hepatectomy in the mild steatosis group was 695.83 ml and in the marked steatosis group was 955.55 ml. p value = 0.0442.

The average blood loss for minor hepatectomy in the mild steatosis group was 409.10 ml and in the marked steatosis group was 633.33 ml. p value = 0.1030.

The average duration of ICU stay in the postoperative period in the major hepatectomy group was 3.42 days. The average duration of ICU stay for major hepatectomy in the mild steatosis group was 2.99 days and for marked steatosis was 4.77 days. p =0.1392.

The average duration of ICU stay in the postoperative period in the minor hepatectomy group was 2.14 days. The average duration of ICU stay for minor hepatectomy in the mild steatosis group was 2.09 days and for marked steatosis was 2.33 days. p =0.1828.

The minor complications in the mild steatosis group were 83.33% and in the marked steatosis was 66.66%. The major complications in the mild steatosis group were 16.66% and in marked steatosis was 33.33% (p=0.3748).

On analysing the mortality, there were 3 (8.57%) deaths in the post-operative period.1 in the mild steatosis group and 2 in the marked steatosis group all of our patients succumbed for multi organ dysfunction.

Table 1: Distribution of steatosis in the subjects

Mild steatosis	24
Marked steatosis	11

Table 2: Distribution of steatosis in relation to BMI

	Mild steatosis	**Marked steatosis**
BMI <30	16	3
BMI >30	8	8

DISCUSSION

A total of 35 cases were included in this study. The patient parameters concerning age, sex, comorbidities, presenting symptoms, and diagnosis were studied and analysed in detail. The surgical management, intra-operative events, post-operative course concerning icu stay, and post-operative complications were analysed.[11] The hepatic steatosis grade of the remnant lobe biopsy was collected and correlated with the post-operative events and analyzed.[12]

On analyzing the results of our study, males predominated the sample constituting 73% of the total subjects. The mean age of our study population was 51.3 yrs.[12] The most common Etiology for partial hepatectomy was malignant hepatic neoplasm (74%).[13] The mixed variety of steatosis was the most common (70%). Mild steatosis was the commonest grade in both the major (63.15%) and minor (90.9%) hepatectomy group.

The authors showed that the minor complications were the predominant postoperative complications and the presence of steatosis did not affect the incidence of major complications.[14]

In our study correlating the preoperative patient parameters with the incidence of steatosis, there was no statistically significant correlation between alcohol consumption and dyslipidemia with the prevalence of hepatic steatosis in our study population.[15] Only the presence of BMI >30 correlated with the prevalence of steatosis.[16,17]

On analyzing the intra-operative blood loss in the major hepatectomy group, the subjects with marked steatosis had more blood loss compared to those with mild steatosis and this was statistically significant p= 0.0442.[18-20] However there was no statistically significant blood loss in the minor hepatectomy group subjects on comparison between mild and marked steatosis p=0.1030.

The consensus that steatosis increases the risk of postoperative complications following major liver resections has been arrived at by the study of Selzer et al.[21] One of the earliest reports analyzing the impact of steatosis on hepatectomy was published by Behrns et al.[22] In a series of 135 patients who underwent hepatic resection, patients with > 30% mixed steatosis developed more complications but had a similar death rate compared with a lesser degree of steatosis.

One of the largest studies published by Jarnagin et al,[23] including 1,803 patients failed to show any statistically significant effect of steatosis on morbidity and mortality in patients undergoing hepatectomy.

Similarly, a large series conducted by Belghiti et al,[24] studying 747 hepatectomies concluded that the patients with mixed steatosis involving >30% of hepatocytes have increased postoperative morbidity compared to those with <30%.

Kooby et al,[25] from the Memorial Sloan-Kettering group published a case–matched study with postoperative outcomes as the primary endpoint in patients with liver steatosis.

CONCLUSION

Steatosis because of its increasing prevalence is an important parameter to be considered in planning before partial hepatectomies. The procedure time,

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duration of ICU stay, and postoperative complications were more in the marked steatosis group but failed to reach a statistically significant proportion on univariate analysis. Only the intra-operative blood loss reached a statistically significant proportion in the marked steatosis group.

Hence we conclude that liver steatosis grade alone is not associated with increased risk post-operative complications in patients undergoing partial hepatectomy.

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