

Complications after One Year of Liver Transplantation among Adult Population

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Received: July 21, 2020; Published: October 09, 2020

Abstract

Background: Liver disease is a major medical problem in Kingdom of Saudi Arabia. Many complications to be encountered after liver transplant range from very serious to less complicated complications and also it differs in the onset of the complication.

Materials and Methods: We have conducted the present observational retrospective chart review study in King Abdulaziz Medical City in Riyadh, Saudi Arabia with a sample of 92 post liver transplantation patients. The following risk factors will be investigated: metabolic syndrome, low levels of high-density lipoprotein, and elevated blood pressure. The diagnosis of acute cellular rejection will be based on histological appearances. Metabolic syndrome is defined by having 3 or more of the following: fasting glucose (≥ 100 mg/dl); abdominal obesity (> 102 cm in men, > 88 cm in women); hypertriglyceridemia (≥ 150 mg/dl); Low levels of high density lipoprotein (HDL) (< 40 mg/dl in men, < 50 mg/dl in women) and elevated blood pressure ($\geq 130/85$ mmHg). Non-critical care adult inpatients who are recently admitted to the liver transplant center who are eligible for inclusion in this study.

Results: In our present study, we have included 92 patients. There were 6.7% (3 out of 45) patients who developed new onset diabetes mellitus (NODM) in our cohort during the first-year post transplantation. 10.9% (7 out of 64) patients have newly diagnosed with hypertension, and 23.0% (20 out of 87) patients developed Dyslipidemia during the first-year post transplantation.

Conclusion: The percentages of developing diabetes mellitus, hypertension and dyslipidemia are lower than the reported in different studies that might be due to lower rate of using corticosteroids in the maintenance immunosuppressive regimen, or due to intensive follow-up and maintenance immunosuppressive monitoring, or because of the good family and social support in our community. However, the patients were conveniently limited to our medical center.

Keywords: Liver Transplantation; Patients; Risk Factors; Complications; Adult Population

Background

Liver disease is a major medical problem in Kingdom of Saudi Arabia and liver transplantation first time was performed in 1991 [1-3]. "Liver transplantation (LT) is a life-saving procedure for patients with end stage liver disease and its complications, and for liver failure". Many complications to be encountered after liver transplant range from very serious to less complicated complications and also it differs in the onset of the complication [4]. These complications include acute rejection, late acute rejection, Ventricular tachycardia/fibrilla-

tion, transient hypotension, pulmonary edema [5], myocardial ischemia [6], dilated cardiomyopathy [7], delirium [8], renal failure [9,10], infections, hypertension [11], hyperlipidemia, diabetes and obesity [12,19]. There are risk factors predisposing to these complications including using high doses of corticosteroids, using specific regimens of immunosuppression agents, age, diabetes mellitus, compensated heart disease, hepatitis C infection and alcoholic cirrhosis [13-15].

After liver transplantation, the patient requires immunosuppressive agents to prevent the body from rejection of the transplanted liver. Induction of immunosuppressive agents and maintenance therapy is required. Immunosuppressive regimens include combination of calcineurin inhibitors (tacrolimus), anti-metabolites (mycophenolate sodium), mTOR inhibitors (sirolimus), steroids or antibody-based therapies. The selection of these combinations must be individualized based on the patient condition. Most of the immunosuppressive regimens combine drugs with different mechanisms of actions [16].

Aim of the Study

The main aim of our present study is to find the complications after liver transplantation among adult population in King Abdulaziz Medical City in Riyadh, Saudi Arabia.

Materials and Methods

We have conducted the present observational retrospective chart review study in King Abdulaziz Medical City in Riyadh, Saudi Arabia with a sample of 92 post liver transplantation patients. The following risk factors will be investigated: Metabolic syndrome is defined by having 3 or more of the following: fasting glucose (≥ 100 mg/dl); Abdominal obesity (> 102 cm in men, > 88 cm in women); hypertriglyceridemia (≥ 150 mg/dl); Low levels of high density lipoprotein (HDL) (< 40 mg/dl in men, < 50 mg/dl in women) and elevated blood pressure ($\geq 130/85$ mmHg).

Section of study subjects: Non-critical care adult inpatients who are recently admitted to the liver transplant center who are eligible for inclusion in this study.

Method of data collection: Data were extracted from medical charts. Data collection sheet was utilized and it included as follows: Ward number, admission date, patient record number, length of stay, and primary team, demographic data (age, gender, height, weight, BMI), treatment protocol for liver transplantation, admission diagnosis, other diseases, current medications and all laboratory and clinical data.

Outcome measures: Primary outcome: prevalence of hypertension, hyperlipidemia, diabetes and cardiovascular events.

Inclusion criteria: Patients who were ≥ 18 years and above; acute renal failure defined as serum creatinine ≥ 2.0 mg/dl in the first 30 days after liver transplantation; the diagnosis of acute cellular rejection will be based on histological appearances; metabolic syndrome defined by having 3 or more of the following: fasting glucose (≥ 100 mg/dl); Abdominal obesity (> 102 cm in men, > 88 cm in women); hypertriglyceridemia (≥ 150 mg/dl); Low levels of high density lipoprotein (HDL) (< 40 mg/dl in men, < 50 mg/dl in women) and elevated blood pressure ($\geq 130/85$ mmHg).

Software used: Microsoft Excel 2010 was used to enter the collected data and analyzed by using SPSS 20.0 version software.

Statistical analysis used: Quantitative data were expressed as Mean \pm Standard Deviation and qualitative data were expressed as frequency and percentage.

Results

In our present study, we have included 92 post liver transplantation patients. Among 92 patients, 44 (47.8%) were males and 48 (52.2%) were female. The mean age of the patients was found as 52.27 ± 11.04 (Range: 18 - 69) years. The most 43 (46.7%) of the patients had the age groups of 51 - 60 years and very less number of 5 (5.4%) patients in the age group of 31 - 40 years. The mean BMI of the included patients in the present study was found as 29.48 ± 6.65. The prevalence of overweight was found in 64 (69.6%) patients. Out of 92 patients, 83 (90.2%) were married and 9 (9.8%) were single. Out of 92 patients, 78 (84.8%) patients had liver graft and 14 (15.2%) had both kidney and liver grafts. Graft type among 92 patients, cadaveric and living were 68 (73.9%), 24 (26.1%) respectively. Among 92 post liver transplantation patients, the cardiovascular event was happened in 4 (4.3%). No family history of any fracture in study respondents and no one having the smoking habits. Baseline characteristics are summarized in table 1. Distribution of complications among genders in the study before and after transplantation is shown in table 2.

Variables	No. of Patients	Percentage
Gender		
Female	48	52.2
Male	44	47.8
Age (in years)		
Age (Mean ± SD)	52.27 ± 11.04 (Range: 18 - 69)	
Age Groups (in Years)		
< 30	7	7.6
31 - 40	5	5.4
41 - 50	17	18.5
51 - 60	43	46.7
> 61	20	21.7
Body Mass Index (BMI) (Kg/m²)	29.48 ± 6.65	
WHO Classifications		
< 18.5 (Underweight)	28	30.4
18.5 - 24.9 (Normal weight)	16	17.4
25.0 - 29.9 (Overweight)	48	52.2
Marital Status		
Married	83	90.2
Single	9	9.8
Smoking Habits		
Yes	0	0
No	92	100.0
Family History of fracture		
Yes	0	0
No	92	100.0
Diabetes Mellitus		
Yes	47	51.0
No	45	49.0
Graft		
Kidney and Liver	14	15.2
Liver	78	84.8
Graft Type		
Cadaveric	68	73.9
Living	24	26.1

Table 1: Distribution of basic characteristics among liver transplantation patients (N = 92).

Complication	Previously diagnosed (Male) n	Previously diagnosed (Female) n	Previously diagnosed (All) n (%)	Newly Diagnosed (Male) n	Newly Diagnosed (Female) n	Newly Diagnosed (All) n (%)
New Onset Diabetes Mellitus	23	24	47 (51.0)	0	3	3 (6.7)
Dyslipidemia	4	1	5 (5.4)	11	9	20 (23.0)
Hypertension	17	11	28 (30.4)	6	1	7 (10.9)

Table 2: Distribution of complications among genders before and after transplantation (N = 92).

There were 6.7% (3 out of 45) patients who developed NODM in our cohort during the first-year post transplantation. 10.9% (7 out of 64) patients have newly diagnosed with hypertension, and 23.0% (20 out of 87) patients developed Dyslipidemia during the first-year post transplantation. The distribution of cardiovascular complications 1 year post liver transplantation is shown in figure 1.

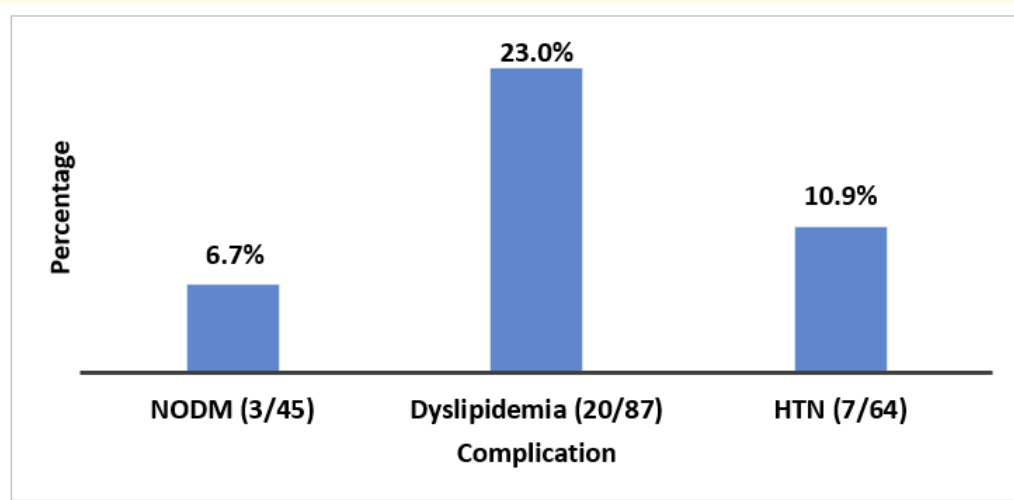


Figure 1: Distribution of cardiovascular complications post liver transplantation.

Discussion

Normally, after the liver transplantation the patients are getting some complications and it would be rectified and sometimes deaths also occur [17,18]. In our present study, the prevalence of overweight was found in 48 (52.2%) patients and it was very high when we have compared a study by Al-Nozha, *et al.* has mentioned the overweight prevalence as 36.9% was conducted in Saudi Arabia [19]. We were looking for complications that may develop in the first year after liver transplantation, such as: diabetes mellitus, hypertension and dyslipidemia. In our study, we have found that (3 out of 45) patients who developed NODM which represents 6.7%. Which was below what have been found in the literature, for example: study was conducted to measure the percentage of developing New-onset diabetes mellitus after liver transplantation, and they found approximately 15% of liver transplant recipients developed New-onset diabetes mellitus. Many risk factors were associated with new-onset diabetes mellitus, including: prior hepatitis C infection, family history of diabetes mellitus, male gender, increasing weight, alcoholic cirrhosis and bolus injections of corticosteroid therapy [20]. Another study that has been published

in 2015 showed that one fourth of the study population had the incidence of NODM on 12 months after liver transplantation [21]. But, the incidence in our present study population was (6.7%) only. Imagawa., *et al.* have found that the prevalence of developing dyslipidemia after liver transplant was (45 - 69%) [22], which was higher in what have we found in our study 23% (20 out of 87). However, another study by Dopazo., *et al.* have found that the prevalence of dyslipidemia after the liver transplantation was 21%, which was similar to our results (23%) [23]. We have also found that, the percentage of patients who have newly diagnosed with hypertension was below what have been found in the literature which was (10.9%), compared to Canzanello., *et al.* which was ranging from 64% to 80% [24]. Another study showed that the prevalence of hypertension after liver transplantation was 53% which was higher than what we have found in our study [25]. The complications prevalence according to gender is shown in table 2 but the numbers were comparable. In one study regarding the cardiovascular events showed that the prevalence of CVEs was 11% but we have got very low percentage (4.3%) [26,27].

Conclusion

The percentages of developing diabetes mellitus, hypertension and dyslipidemia are lower than the reported in different studies that might be due to lower rate of using corticosteroids in the maintenance immunosuppressive regimen, or due to intensive follow-up and maintenance immunosuppressive monitoring, or because of the good family and social support in our community. However, the patients were conveniently limited to our medical center. This study is a single centered, retrospective chart review that represents an individual experience, the convenient sample size can limit the generalizability of these findings. The follow-up time after transplantation was limited to one year and these complications may or may not develop in such a short period of follow-up. Further future studies that extend follow-up time and involve different transplantation types.

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Volume 8 Issue 11 November 2020

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