

Rapid Reversal of Liver Steatosis With Life Style Modification in Highly Motivated Liver Donors



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Background: Liver steatosis is the leading cause of donor rejection in living donor liver transplantation. Rapid weight loss is difficult to achieve in a short period of time, moreover it has been thought to worsen liver histology. **Methods:** Donors who had significant steatosis based on liver biopsy were recommended 1200 Kcal/day and a minimum of 60 min/day moderate cardio training. Two patients were advised statins for dyslipidemia. None of the donors had metabolic syndrome. A second ultrasound guided liver biopsy was done at 28 ± 10 days. Donors with nonalcoholic steatohepatitis/fibrosis or >30% steatosis were not included. **Results:** From July 2010 to January 2015, 16 donors were advised aggressive life style modification after initial biopsy; 15 (10 males, age 27.5 ± 6.5 years, baseline body mass index 28.4 ± 2.1 Kg/M²) successfully reduced weight and 14 underwent donation after favorable second biopsy. Mean weight loss was 7 ± 4.3 kg (8.4 ± 4.6%). Second liver biopsy was done at 28 ± 10 days, there was decrease in steatosis in all but one including normalization of liver biopsy in 7 donors. Three donors had mild inflammation on first biopsy and they had improvement in second biopsy. All the donors and their recipients had an uneventful post-operative course. **Conclusion:** Steatosis can be reversed in a short duration by aggressive life style modifications in highly motivated liver donors. (J CLIN EXP HEPATOL 2015;5:123-126)

Non-alcoholic fatty liver disease (NAFLD) is common amongst obese population and weight loss has been shown to reverse all histological aspects of NAFLD including steatosis, inflammation, ballooning and fibrosis.^{1,2} In addition NAFLD is leading cause of donor rejection in living donor liver transplantation program at our centre.³ Achievement and maintenance of weight loss is difficult in clinical practice. Data on effect of weight loss on liver histology in NAFLD patients has come from either clinical trials which achieve weight loss on a long term or from studies of bariatric surgery patients. Rapid weight loss is not recommended due to fear of worsening of inflammation,⁴ moreover is difficult to achieve in clinical practice in poorly motivated asymptomatic NAFLD patients. However, rapid weight loss is often only option for prospective liver donors (in absence of other donors in family) who want to donate their liver to their loved ones as they can't wait too long as they are too sick or have hepatocellular carcinoma. We report our

experience of this unique cohort (young donors, no comorbidities, emotionally motivated for weight loss on a short term basis) of 15 prospective liver donors who had paired liver biopsies.

MATERIAL AND METHODS

The study was conducted at a tertiary care centre in a high volume LDLT centre. The study was approved by institute's ethical committee. As part of donor work-up, a non-contrast CT scan was used as a non-invasive modality to assess donor steatosis. We use liver attenuation index (LAI, defined as attenuation index of liver minus attenuation index of spleen measured at multiple areas). A difference of less than 5⁵ or liver attenuation value <53 (based on our previous experience) was taken as suggestive of hepatic steatosis.

Prospective liver donors with liver attenuation index value between 0 and 5 or liver attenuation <53 HU, presence of dyslipidemia or body mass index >28 kg/m² were taken for liver biopsy before liver donation. Donors with non-alcoholic steatohepatitis were excluded from the study as we do not take them as donors. Donors who had a remnant volume less than 30% (the lower limit of acceptance) were advised for liver biopsy to rule out steatosis and inflammation and were taken up for a repeat liver biopsy before donation. From July 2010 to January 2015, 16 prospective liver donors were advised for weight loss based on significant steatosis on liver biopsy. They were

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Abbreviations: ALT: alanine transaminase; AST: aspartate transaminase; BMI: body mass index; LAI: liver attenuation index; LDLT: living donor liver transplantation; NAFLD: non-alcoholic fatty liver disease

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advised 1200 Kcal per day diet (including 50–60 g proteins) and minimum of 60 min moderate activity in the form of brisk walk (200–400 Kcal) as exercise, they were free to do more exercise if they wanted to do. Fourteen prospective donors were taken up for repeat liver biopsy. Two of these donors had 10% steatosis, still they were advised for life style modification and second biopsy to increase donor safety as they had borderline remnant. Second liver biopsy was done if they had some weight loss and favorable repeat LAI assessment.

Statistical Methods

The results are shown as mean (SD), % and numbers. The baseline and after weight loss parameters were compared with paired t-test (SPSS 16, Chicago Inc).

RESULTS

In the given period, liver biopsies were done in 374 actual donors (after exclusion of NASH/fibrosis), 188 of these were diagnosed as non-alcoholic fatty liver. The study cohort consisted of 16 prospective liver donors who underwent paired liver biopsies before liver donation and 14 (7.4% of all NAFLD donors) of them had successful donation as shown in flow chart (Figure 1). In the same time, 2 donors had non-alcoholic steatohepatitis and 2 had fibrosis and were not taken as donors. They were advised for weight loss by life style modification as they had >20% steatosis or borderline remnant. Fifteen donors (10 males and 5 females) were taken up for a second liver biopsy after some weight loss (no cut-off predetermined) and favorable LAI assessment, one donor who could not loss weight was not taken up for repeat liver biopsy. Mean age of the donors was 27.5 ± 6.5 years and baseline

Table 1 Characteristics of 15 Donors.

S. no	Age years	Sex	Baseline BMI Kg/m ²	% Weight change	Biopsy interval	Steatosis first biopsy	Steatosis second biopsy
1	36	M	25.9	7.6	38	25	10
2	36	F	28.9	4	34	25	<5
3	27	M	25.2	13.8	50	15	10
4	22	M	27.3	6.3	22	10	<5
5	38	F	29.5	11.5	21	10	<5
6	28	M	28	3.6	13	15	<5
7	23	M	25.9	14.6	29	20	10
8	21	F	27.5	5.5	32	15	<5
9	20	M	26.7	2.5	21	15	5
10	36	F	31.6	7.6	21	15	<5
11	21	F	22.7	3.5	21	15	10
12	21	M	28.1	14.7	28	25	25
13	23	M	26.6	8	21	20	5
14	29	M	31.3	15.6	44	20	<5
15	32	M	28.4	6.9	21	20	10

BMI was 28.4 ± 2.1 Kg/M². Characteristics of these 15 donors are shown in Table 1. All of these donors had normal liver enzymes as shown in Table 2. None of these prospective liver donors had diabetes, hypertension or metabolic syndrome. Mean weight loss was 7 ± 4.3 kg (8.4 ± 4.6% of initial body weight). Lipid profile of 15 donors was as follows: total cholesterol 155 ± 45 mg/dL, triglycerides 122 ± 65 mg/dL, low density lipoprotein 95 ± 38 mg/dL and high density lipoprotein 38 ± 9.8 mg/dL. Three of these donors had mild inflammation at baseline liver

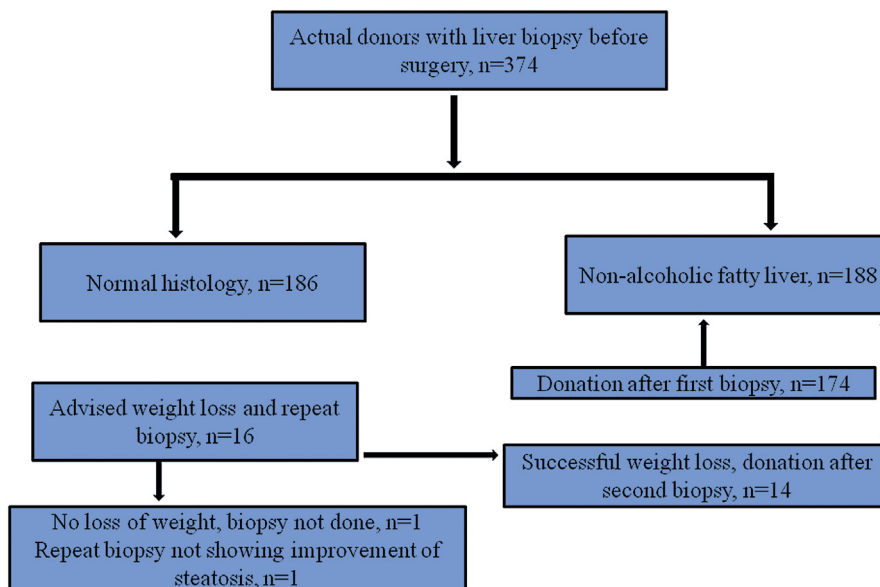


Figure 1 Selection of donors for paired biopsy.

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