

The long-term quality of life following liver transplantation in a developing country with a free health care system

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Abstract

Introduction: Developing countries with limited resources are yet to establish universal liver transplant (LT) services to cater to their population free of charge. In this unique setting, no data are published on the long-term Quality of life (QoL) of LT survivors.

Objectives: Compare the long-term quality of life of post-liver transplant patients with a matching cohort of pre-transplant cirrhotic patients and a matching non cirrhotic control group.

Methods: Of the 45 liver transplants that were performed there were 24 patients who completed over 6 months of follow-up. Of these, 4 patients died (including one lost to follow-up) after six months. The remaining 20 post-transplant patients were the subjects for QoL assessment. One post-transplant recipient was matched with two pre-transplant cirrhotic patients and non-cirrhotic healthy control group. QoL was evaluated by the SF-36 questionnaire.

Results and conclusions: The median age was 54 years (27-67) and 85% (n=17) were male. The median follow up was 24 months (6-94 months). The median MELD score was 17 (11-22) and 75% (n=15) were due to cryptogenic cirrhosis. Post-operatively three (15%) developed graft rejection, five (25%) had infections and ten (50%) suffered drug related complications. 95% (n=19) of the population had satisfactory drug compliance. The study population had significantly better QoL compared to control in all eight domains (p<0.05) including physical functioning (76% vs 52.7%), physical health (80% vs 7.9%), emotional problems (93% vs 17.1%), energy (77% vs 47%), emotional wellbeing (80% vs 61.1%), social functioning (86.9% vs 56.9%), pain (82% vs 47.5%) and general health (67.5% vs 37.5%). The study population had similar quality of life compared

to the healthy control group with better-perceived emotional well-being.

Conclusion: Long-term survivors after LT have significantly improved QoL in a setting with limited resources.

Introduction

Liver transplantation (LT) has established itself as the definitive treatment for end-stage liver disease, offering prolonged life expectancy and better quality of life to these patients.

LT has become a reality in developed countries due to well-established donor programmes, financial support and good social care network [1, 2]. Developing countries are yet to establish universal LT services for their population. Sri Lanka is a middle-income country, with free health care services available to the public [3]. There is no public health insurance system established in the country. Initiation of a LT programme in a developing country is a formidable challenge [4]. In this background, Colombo North Liver Transplantation service, the second in the country, was established in 2014 to meet the rising demand in the country. Over the last five years, it has carried out successful liver transplants with minimal financial burden to patients.

The majority of data on post-LT quality of life (QoL) is reported from developed countries with good support systems to look after the post-transplant patients [5]. Sri Lanka has different social, cultural and economic background compared to developed countries without well-established public-funded social care services [6]. There are no data published in this unique setting on

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long-term LT survivors' QoL. This study looks at the QoL in long-term survivors after LT in a developing country with limited resources.

Material and methods

Study population

A total of 45 liver transplants were performed during the period. There were 12 peri-operative mortalities. Four patients died during follow-up beyond six months. This included one patient lost to follow-up and later presented with fatal rejection. Of the remaining patients, ones who had completed six-months follow-up were selected for the study. There were 20 cases fulfilling the criteria. Basic demographic data, pre-operative liver status, post-operative complications, drugs compliance and clinic follow up were analysed.

Assessment of quality of life

QoL was assessed using the validated Sri Lankan version of the Medical Outcomes Study SF-36 [7]. The SF-36 is a validated self-administered questionnaire used internationally to measure eight domains of health: physical functioning, physical health, emotional problems, emotional wellbeing, energy, social functioning, pain and general health. The raw scores of each subscale were converted to scores that ranged from 0 to 100, with higher scores indicating higher levels of functioning or well-being.

Control groups

As one control group (control group A) each case was matched with two patients with end stage liver disease awaiting LT. During selection of control, age, gender and MELD (model for end stage liver disease) score were matched. The second control group (control group B) were age and gender matched healthy individuals. The control group B was selected from the surgical ward visitors and bystanders.

Data collection

Quality of life questionnaire was given to the patients during clinic visits. Remaining data were collected using interviewer-administered questionnaire reviewing patients' previous records and direct questioning.

Data Analysis

Statistical analysis was performed using SPSS statistical software, version 21.0. Scores from recipients were respectively compared with control group. QoL Between the groups were tested with independent-sample Student t test. A probability value of $P < 0.05$ was taken to represent a significant difference. The level of HRQoL was assessed by comparing the mean value for the study sample with that for a representative control group of patients with chronic liver disease and a control group without cirrhosis.

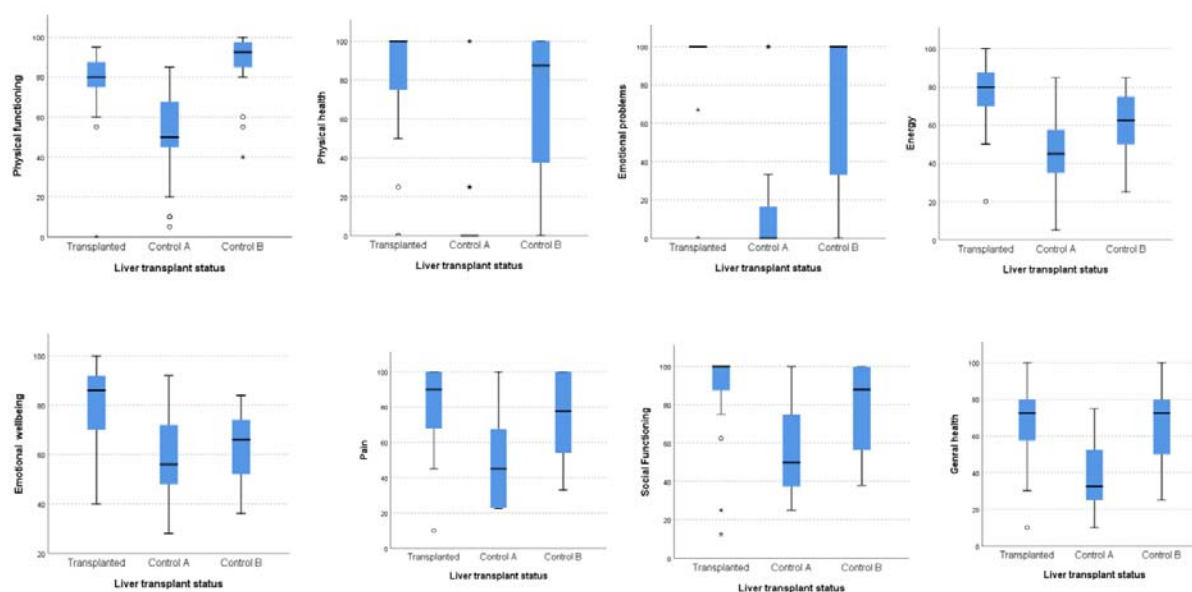
Results

The median age of the study population was 54 years (27-67 years). Majority, 85% (n=17) were males. The median follow up was 24 months (6-66 months). All patients were either Child B (n=12, 60%) or C (n= 8, 40%) with a median Child score of 10 (7-13). The median MELD score was 17 (12-26). In a majority (75%, n=15) cryptogenic cirrhosis was the indication for LT. The baseline parameters of the control groups A and B were statistically similar to the test sample. The median age of the control group A was 54 years (34-67) and 67.5% were males. 65% were Childs B and 30% were Childs C cirrhotics. The median MELD score was 16 (12-24) in the control group A. The median age of the control group B was 54years (28-72) with and 85% were males. All the patients in the control group B were non cirrhotics.

Post-operatively after six months, three (15%) developed graft rejection, five (25%) had infections needing hospital admission and 6 (30%) suffered drug related complications. 95% (n=19) of the population had satisfactory drug compliance and clinic attendance more than 90% on the scheduled date.

The study population had significantly better QoL compared to control group A in all eight domains ($p < 0.05$) including physical functioning (76% vs. 52.7%, $p < 0.01$), physical health (80% vs. 7.9%, $P < 0.01$), emotional problems (93% vs. 17.1%, $p < 0.01$), energy (77% vs. 47%, $p < 0.01$), emotional wellbeing (80% vs. 61.1%, $p < 0.01$), social functioning (86.9% vs. 56.9%, $p < 0.01$), pain (82% vs. 47.5%, $p < 0.01$) and general health (67.5% vs. 37.5%, $p < 0.01$). Physical health, emotional problems and general health were the areas where post transplants patients had marked improvement compared the control group A (Table 1). The study population was compared with the control group B who were a non-cirrhotic age and gender matched cohort. The post liver transplant patients had similar quality of life compared to the non-cirrhotic control group and had better quality of life scores in some of the domains. There was no statistically significant difference in physical functioning ($P=0.333$), physical health ($P=1.000$), emotional problems ($P=0.625$), energy (0.064), social functioning ($P=0.98$), pain ($P=1.00$) and general health ($P=1.00$). However post transplant group perceived better emotional wellbeing compared to the non cirrhotics (control group B) in emotional wellbeing ($P=0.01$).

A subgroup analysis was done to analyse the socio demographic factors affecting QoL among those who received a LT. Gender did not have an effect on the quality of life. There was no significant difference among males and females with regard to quality-of-life domains physical functioning (76% vs 92.5%, $P=0.88$), physical health (80% vs 87.5%, $P=0.11$), emotional problems (93% vs 100%, $P=0.82$), energy (77% vs 62.5%, $P=0.456$), emotional wellbeing (80% vs 66%, $P=0.95$), social functioning (87% vs 88%, $P=0.86$), pain (82% vs 77.5%, $P=0.85$) and general health (68% vs 72.5%, $P=0.31$).



Graph 1. Comparison of quality-of-life scores among the three groups.

Table 1. Median performance scores in each domain in transplanted vs control groups A and B

Variable	Transplanted cohort	Control group (A)	Control group (B)
Physical functioning	76 (0-90)	52 (5-80) <0.01	92.5 (40-100) P=0.33
Physical health	80 (0-100)	8 (0-100) <0.01	87.5 (0-100) P=1.00
Emotional problems	93 (0-100)	17 (0-100) <0.01	100 (0-100) P=0.625
Energy	77 (20-100)	47 (5-85) <0.01	62.5 (25-85) P=0.064
Emotional wellbeing	80 (40-100)	61 (28-92) <0.01	66 (36-84) P=0.010
Social functioning	87 (13-100)	57 (25-100) <0.01	88 (38-100) P= 0.98
Pain	82 (10-100)	48 (23-100) <0.01	77.5 (33-100) P=1.00
General health	68 (10-100)	38 (15-75) <0.01	72.5 (25-100) P=1.00

A better quality of life was seen among married post-transplant patients in the domains of emotional problems ($P=0.002$), energy ($P=0.002$) social functioning ($P=0.026$) and pain ($P=0.036$). There was no significant difference in the other domains such as physical functioning ($P=0.3$), physical health ($P=0.46$) emotional well-being ($P=0.138$) and general health ($P=0.067$).

Discussion

Post-transplant survival currently exceeds 80% at five years and is approaching 70% at 10 years in USA [8]. As survival has improved substantially, the focus on outcome assessment following transplant has shifted towards

improving the QoL [9]. The World Health Organization (WHO) defines QoL as “state of complete physical, mental, and social well-being and not merely the absence of disease and infirmity”. Majority of published data on post-LT QoL are derived from developed countries, which showed improved physical and mental health following LT. The QoL has shown to significantly improve following the first six to twelve months and remain stabilized afterwards [10].

In our experience there were 12/45 (26.6%) peri-operative mortalities. Majority of the deaths were related to sepsis and primary non-function. Considering the wide range of challenges faced, establishing a state funded LT

program in a developing country with limited resources is a challenging task. There are many high-volume, well established living donor LT programs in countries like India and Pakistan. However, all these programmes are self-funded and are based in private hospitals [11]. This has made a lifesaving treatment available only for the ones who can financially afford it. LT is technically and financially demanding. Allocating resources to an expensive surgery that benefit few patients when there are large volume of patients in need of other basic services is an argument brought on by policy makers in developing states. However, health authorities in Sri Lanka have identified the need for and importance of LT services and strategies were changed to fund few specialised centres.

The long-term success of the LT programmes in developed countries relies on a good support network of social care workers and community nurses during the post-transplant period. Sri Lanka lacks this type of support services due to financial constraints of a publicly funded health care service [12, 13]. Though a developing country, Sri Lanka has unique social background. Among Sri Lankans, there are close links between immediate and extended families. Most of the instances they become the primary care givers. Furthermore, Sri Lanka has one of the highest literacy rates among developing countries [6]. This cohort of patients reported good long-term outcome even without a well-established formal social support system. It is likely that our observations are related to this unique situation in Sri Lanka.

In a study done comparing a group of cirrhotic patients with a healthy controls in India it was demonstrated that the domains of physical components (bodily pain, physical function and abdominal symptoms) significantly lowered the mental components (emotional and social functioning) of the cirrhotic patients [14]. The situation in Sri Lanka among the cirrhotic patients who were the control group could have been similar with the added financial burden to the patient and the family since the majority of the study population were middle-aged males who would have been the breadwinner in the family. Following LT, the improvements in physical and social functioning would have improved the mental components of the QoL leading to an overall improvement in the QoL. Several studies have addressed the effect of socio-economic and demographic factors on the QoL of LT recipients. Higher educational status and income preoperatively was associated with better QoL post-LT [9]. Among the patients who underwent LT, those who went back to work had better QoL compared to those who were not reemployed [15]. In our study population the pre and post operative employment status did not have a significant impact on the post-operative QoL. However, those who had higher education had better QoL compared to those who had lesser degree of education in all eight domains of QoL. Marital status was associated with better QoL in the domains of emotional problems, energy and

social functioning in our study populations. The positive effect of marital status on post-LT QoL was evident in a meta-analysis done on adult disease donor LT QoL [16].

Our study group of post liver transplant patients had statistically similar scores in quality of life compared to the matched non cirrhotic (control group B). Interestingly, they had statistically significant better emotional wellbeing compared to the healthy control group. This may be due to the post-transplant patient's perceiving better quality of life compared to the extremely poor quality of life before the transplant. This observation has a clinically significant impact in post liver transplant management. Especially the apparent over assessment of well-being may lead to poor drug compliance and pre transplant unhealthy lifestyles after first six months.

There are few studies, which compared the QoL before and after liver transplant, which showed marked improvement in QoL after LT [17]. Although this is an obvious outcome, comparing the pre and post-transplant QoL with sub group analysis would have helped us to determine sub groups of patients who had highest improvement in QoL. However, our cohort did not have their QoL assessed before the transplant. To overcome this a matched control was used. This is one of the drawbacks of our study.

In conclusion, the long-term survivors of LT had a better QoL compared to non-transplanted end stage liver disease patients, even in a setting with limited resources. They had a good quality of life almost equal to the healthy control group.

Ethical Consent

Informed consent was obtained from all individual participants included in the study. This study was approved by the North Colombo Teaching Hospital Ethical Review Committee.

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