Liver Transplantation in India: At the Crossroads

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As the liver transplant journey in India reaches substantial numbers and suggests quality technical expertise, it is time to dispassionately look at the big picture, identify problems, and consider corrective measures for the future. Several features characterize the current scenario. Although the proportion of deceased donor liver transplants is increasing, besides major regional imbalances, the activity is heavily loaded in favor of the private sector and live donor transplants. The high costs of the procedure, the poor participation of public hospitals, the lack of a national registry, and outcomes reporting are issues of concern. Organ sharing protocols currently based on chronology or institutional rotation need to move to a more justiciable severity-based system. Several measures can expand the deceased donor pool. The safety of the living donor continues to need close scrutiny and focus. Multiple medical challenges unique to the Indian situation are also being thrown up. Although many of the deficits demand state intervention and policy changes the transplant community needs to take notice and highlight them. The future of liver transplantation in India should move toward a more accountable, equitable, and accessible form. We owe this to our citizens who have shown tremendous faith in us by volunteering to be living donors as well as consenting for deceased donation. (J Clin Exp Hepatol 2015;5:329–340)

Liver transplantation (LT) arrived in India many decades after it was successfully performed in the developed world. A few years after the Government of India passed the Human Organs Transplant Act (HOTA) in 1994 recognizing brain death, the first attempt at a deceased donor liver transplant (DDLT) was made in Chennai in 1996 at the Apollo Hospital.[1] Following this, a few sporadic procedures were performed in Delhi, Mumbai, and Chennai in the late 1990s. It was however only at the turn of the millennium that limited but meaningful LT activity started taking place.

In spite of the law being in place, there had not been much progress on deceased donation for many years. Hence surgeons, many of who had trained in Western centers in deceased donor transplantation and were impatiently waiting in the wings, turned their attention to live donor liver transplantation (LDLT). By that time surgeons in countries like Korea, Hong Kong, and Japan where deceased donation was very limited had perfected the live donor procedure over many years, partly because of their immense experience in hepatobiliary surgery. Surgeons from India traveled to these centers and acquired training.

The first serious attempt at a program of LDLT was at the Sir Gangaram Hospital in Delhi. The early results were not satisfactory.[1] The team persisted and soon started seeing increasing success. With success came numbers as well as replication in other centers. Gradually, the number of transplants as well as centers across the country started increasing. By 2007, it was estimated that 346 procedures had been performed in 22 centers out of which 250 were LDLTs.[1]

The last few years have seen an exponential rise in the number of LTs in India. This is mainly a result of a large numbers of LDLTs being performed in a few select centers that have evolved into specialist LDLT departments. They attract patients from all over India as well as neighboring countries. Paralleling this, there has been a significant increase in DDLTs, mainly in Tamil Nadu but also in Maharashtra, Gujarat, Andhra Pradesh, and Kerala.[2] Though LDLT still remains the dominant form, some centers mainly in the South and West are now beginning to perform a mix of both procedures. Although the lack of

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Abbreviations: ALF: acute liver failure; CMV: cytomegalovirus; CT: computerized tomography; DBD: donation after brain death; DCD: donation after cardiac death; DDLT: deceased donor liver transplant; DNA: deoxyribonucleic acid; HCC: hepatocellular carcinoma; HCV: hepatitis C virus; HOTA: Human Organs Transplant Act; ICU: intensive care unit; INASL: Indian Association for Study of the Liver; ISOT: Indian Society of Organ Transplantation; KCH: King's College Hospital; LDLT: live donor liver transplantation; LT: liver transplantation; MELD: model for end stage liver disease; NASH: non-alcoholic steatohepatitis; NGO: non-governmental organizations; NOTTO: National Organ and Tissue Transplant Organization; NTORC: non transplant organ retrieval center; OPTN: Organ Procurement Transplant Network; RGJAY: Rajiv Gandhi JeevandayeeArogyaYojana; ROTTO: Regional Organ and Tissue Transplant Organization; SOTTO: State Organ and Tissue Transplant Organization; SRTR: Scientific Registry of Transplant Recipients; TB: tuberculosis; UCSF: University of California San Francisco; UKELD: United Kingdom End stage Liver Disease; UKNHSBT: UK the National Health Services Blood and Transplant Authority; UK: United Kingdom; UNOS: United Network for Organ Sharing; USA: United States of America; ZTCC: Zonal Transplant Coordination Centre

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a centralized registry and database makes it difficult to estimate the precise number, based on personal communication from centers, numbers in publications, and information available on the Internet, we estimate that by now around 7500 liver transplants have been performed across the country.

The availability of LT in India has undoubtedly created the opportunity of a lifesaving procedure for individuals dying from end-stage liver disease. By itself, this is a huge leap forward. A ripple effect on other specialties including the emergence of dedicated hepatologists, anesthetists, and intensivists has also occurred. In a less appreciated phenomenon, in many institutions, clinicians involved with LT have enabled deceased donation from the sidelines. For example, we have been witness to the fact that in Mumbai liver transplant surgeons and physicians played a key role by prodding and fostering deceased donation in the centers they worked. In the first few deceased donations where only kidneys were retrieved, LT surgeons performed the harvesting in fairly challenging and sometimes-hostile surroundings. The role of the liver transplant team at the Army Research and Referral Hospital in promoting a national network of deceased donation among the armed forces medical institutions has been exceptional.[3] Thus, LT activity has also spurred the overall growth of deceased donation in India.

Emboldened by success and with increasing confidence with the procedure, the last few years have also seen teams performing spilt transplantation, dual lobe LDLT, swap LDLT, and a few domino and auxiliary procedures.[4–6] This is good evidence of sophisticated technical expertise as well as effective teamwork and coordination. Also, this has led to increased performance of complex hepatobiliary procedures.

However, as the initial sense of euphoria recedes, the number of transplants reaches meaningful numbers and with moves to setup a national network for organ sharing, and this is an opportune time for the LT community to critically analyze what has been achieved over the last decade. For a procedure that demands huge resources as well as public policy interventions, such periodic reflection is necessary not only for grasping the big picture to restore a sense of proportion but also to identify problems and make necessary course correction. The information base for this review consists of publications accessed from standard databases, data from the websites of organ sharing networks, newspaper reports, and personal communications with members of the liver transplant community. Two of the authors have been involved in LT in Mumbai from its inception. The lead author also chairs the liver committee of the Zonal Transplant Coordination Center (ZTCC), Mumbai and has been involved in data collection and organ sharing policy formulation. Some of the observations in the paper draw from this experience.

Early literature on LT in India is marked by reportage of achievements and a certain self-congratulatory note. This is beginning to change and some reflective, analytical writing is beginning to emerge.[7,8] However, there is still a paucity of substantive discussion on areas like organ sharing protocols, registry, donor problems, recipient outcomes, economic considerations, and inequities in the pattern of activity. One reason for this may be that these are sensitive areas and the solutions may be seen to lie with agencies like the state. However, we feel it is incumbent on the Hepatology and liver transplant community to at least initiate a discourse on some of these issues. Keeping this in mind, in this review we have attempted to flag issues specific to the current trajectory of LT in India, which demand some course correction. Some of the important issues covered include the scale and pattern of LT activity, imbalances, indications, outcomes, challenges in deceased donation and organ allocation, impact of live donor transplant, unique medical problems, accessibility and affordability, and future trends. We also try to offer possible alternatives to overcome some of the challenges.

WHAT IS THE SCALE OF LT? WHAT IS THE PATTERN OF DISTRIBUTION OF CENTERS? WHAT ARE THE IMBALANCES?

Like the rest of the world, chronic liver disease has emerged as a huge burden in India. With increasing incidence of alcoholism, diabetes, and obesity, it is also expected to rise substantially.[9] As health seeking behavior and the use of diagnostic tests increase, more cases of liver disease and hepatocellular carcinoma (HCC) are being diagnosed. A majority of HCCs in India are seen on the background of liver disease.[10]

It has been estimated that approximately 20,000 people require liver transplant in India annually.[1] Even this is likely to be a gross underestimate as it is based on numbers of chronic liver disease patients who seek specialist hospital care. Yet only around 800–1000 LTs are currently performed every year.[11] Although across India more than 200 centers are recognized by the government to perform LT, there are only about 25 centers with active programs. In Mumbai city, 20 centers are recognized for LT but currently only 6 perform it regularly.

There are enormous regional imbalances in the availability of LT services in India and are currently largely restricted to metros like Delhi, Hyderabad, Kochi, Chennai, and Mumbai. Large swathes of the country, especially the eastern states and the North-East, have no center offering LT. Large states like Madhya Pradesh, Uttar Pradesh, and Rajasthan have witnessed negligible activity. Though such imbalances are intrinsic to health care in India, the disparity in LT is stark. One reason for this is that LT in India is not an organized national service but a project largely left to the strategic interests of the corporate private sector.