Intestinal failure: a viable proposition in India

Frederick Vyas • Benjamin Perakath

Received: 22 June 2012 / Accepted: 26 July 2012 / Published online: 6 September 2012

© Indian Society of Gastroenterology 2012

Total parenteral nutrition (TPN) is currently the primary maintenance therapy for patients with irreversible gut failure. It is associated with significant morbidity and mortality and poor quality of life. Liver disease is the most common complication of TPN. Thrombosis at site of insertion, recurrent episodes of catheter related sepsis, dehydration, formation of renal calculi and electrolyte disorders are other common complications [1]. Small bowel transplantation has evolved as a successful therapeutic option in the treatment of irreversible gut failure.

Cadaveric small bowel transplantation is associated with satisfactory outcomes at most centers. However, the high mortality rate among patients awaiting intestinal transplants exceeds that among candidates waiting for solid organ transplants in certain age groups especially children.

Living donor intestinal transplant (LDIT) has emerged as a viable option in patients with intestinal failure. Use of living donors makes the transplant an elective procedure with minimal waiting and cold ischemia times and allows HLA matching. Further, the desire to help a suffering member of the family, particularly for parents donating to their sick child confers psychological benefit even though they do not undergo an operation to improve their own health [2]. Factors such as size match are not as crucial in LDIT as in cadaver transplant, where a donor that is 50 % to 75 % of the size of the recipient is usually preferred, owing to multiple prior laparotomies, adhesions and loss of abdominal wall in the recipient.

LDIT can be performed as an elective operation when both the donor and recipient are in best possible health and after complete evaluation of the donor, unlike cadaveric transplants, which, by necessity, have to be performed as and when a graft becomes available. Again donor bowel preparation can easily be performed, reducing the risk of infectious complications.

Though the significance of HLA matching in intestinal transplant is still to be determined, potential immunologic advantage can be obtained by using HLA matched grafts, even though experienced programs have attained low rate of rejection with poorly matched diseased intestinal grafts [3].

By co-ordinating the donor and recipient operations and using parallel teams, the cold ischemia time (<5 h) can be minimized and the risk of risk of ischemic damage to the graft due to hemodynamic instability of the donor leading to splanchnic hypoperfusion is virtually eliminated. In their series of 26 cases of LDIT, Benedetti et al. reported a cold ischemia time of 5 min and warm ischemia time of 30 min [3].

Two important goals of LDIT are donor safety and TPN independence. According to the technique standardized by Gruessner and Sharp [4], a graft of around 200 cm in adult recipients and 150 cm in pediatric recipients is sufficient to obtain TPN independence. This corresponds to approximately 40 % of the total bowel length in the donor. The length of the bowel left in the donor is very crucial. More importantly, at least 60 % of the initial length of the small intestine should be left behind in the donor. Retaining the distal 20 cms of ileum is important to prevent lipid malabsorption and development of macrocytic anemia due to vitamin B₁₂ deficiency. Inclusion of the entire ileum and ileocecal valve along with the right colon are associated with diarrhea and impaired vitamin B₁₂ absorption in the donor.

Harvesting of the ileum is achieved with greater technical ease than that of the jejunum from a living related donor.

F. Vyas
Department of HPB Surgery, Christian Medical College,
Vellore 632 004 Tamil Nadu, India

B. Perakath (✉)
Surgery Unit 2, General and Colorectal Surgery,
Christian Medical College,
Vellore 632 004 Tamil Nadu, India
e-mail: benjamin@cmcvellore.ac.in

Jejunal vessels are narrow and a considerable length of donor small intestine must be resected to harvest an adequate size of vessel for anastomosis [5]. Owing to complex vascular reconstructions, numerous complications are reported after jejunal grafts [6].

The most obvious disadvantage of any living donor transplantation is donor morbidity. Like any major surgical procedure, there is always a risk of general complications like deep vein thrombosis, pulmonary embolism and chest infections. Specifically related to intestinal resection are anastomotic leakage or stenosis and peritoneal adhesions and consequences of a major bowel resection. Benedetti et al. reported a partial period of intestinal insufficiency characterized by increased number of bowel movements, weight loss and vitamin B₁₂ deficiency which, however, were self limiting and of no major consequences to the donor [7].

The role of intestinal transplantation in candidates with complications of parenteral nutrition is well defined. Conversely, the role of preemptive transplant in patients who have lifelong dependency on parenteral nutrition, have not had complications, and seek to improve their quality of life is not well defined even though limited available data favors preemptive transplant [8].

Again, the use of live donors potentially opens the doors for organ sales, more so when the morbidity is not very high or life threatening. Coercion or financial motives behind the donation should be probed and actively discouraged and the onus lies on the treating physician and the transplant team.

In this issue of the Indian Journal of Gastroenterology, Kumaran and colleagues [9] from Sir Ganga Ram Hospital, Delhi report the first LDIT done in India. While the operation was a technical success, the patient succumbed to post-operative complications and sepsis 43 days after the transplant. The authors have detailed the surgical technique used, which is the standard technique described by Gruessner and Sharp [4]. The indication for intestinal transplant was the inability to administer TPN due to progressive loss of venous access. Postoperative management, immunosuppression and assessment of rejection were according to standard protocols. The authors have investigated postoperative complications adequately and dealt with them appropriately. Surely the lessons learnt from this transplant will be useful in the future, and the authors should be congratulated for sharing them.

The cost of LDIT in the private sector as reported by these workers is high, almost prohibitive. However, as with other operations, costs decrease with increasing experience, and should not be a deterrent to introduction of new techniques

or operations. Modification of protocols in the Indian setting can perhaps bring costs down further, but this should not be at the expense of patient safety. There is a need for dedicated ‘intestinal failure units’ in the country, as short bowel syndrome and enterocutaneous fistulae are not uncommon in surgical practice in India.

It could be argued that the patient could have had a deceased donor transplant instead of a LDIT. With the considerable experience the senior authors have with live donor liver transplants, it is no surprise that their first attempt has been a LDIT. Centres more proficient at deceased donor transplants, with a larger cadaver pool, could perhaps offer cadaveric transplants in the future.

In conclusion, intestinal transplant continues to be challenging, but provides a viable option for individuals with intestinal failure on TPN. Though LDIT offers substantial advantages, the cadaveric pool in our country, though tiny, needs to be explored since patients waiting for intestine-only transplant can be managed with parenteral nutrition. Perhaps LDIT should be reserved for pediatric patients with combined intestinal and liver failure, for whom a size matched cadaveric donor is difficult to find, and adults with lack of central venous access.

References

1. Buchman AL, Scalapio J, Fryer J. AGA technical review on short bowel syndrome and intestinal transplantation. *Gastroenterology*. 2003;124:1111–34.
2. Fryer J, Angelos P. Is there a role for living donor intestine transplants? *Prog Transplant*. 2004;14:321–9.
3. Tzvetanov IG, Oberholzer J, Beedetti E. Current status of living donor small bowel transplantation. *Curr Opin Organ Transplant*. 2010;15:346–8.
4. Gruessner RW, Sharp HL. Living-related intestinal transplantation: first report of a standardized surgical technique. *Transplantation*. 1997;11:271–4.
5. Taguchi T, Suita S. Segmental small-intestinal transplantation: a comparison of jejunal and ileal grafts. *Surgery*. 2002;131:S294–300.
6. Jaffe BM, Beck R, Flint L, et al. Living-related small bowel transplantation in adults: a report of two patients. *Transplant Proc*. 1997;29:1851–2.
7. Benedetti E, Holterman M, Asolate M, et al. Living related segmental bowel transplantation: from experimental to standardized procedure. *Ann Surg*. 2006;244:694–9.
8. Fishbein TM. Intestinal transplantation: current concepts. *N Engl J Med*. 2009;361:998–1008.
9. Kumaran V, Mehta NN, Varma V, et al. Living donor intestinal transplant using a standardized technique: First Report from India. *Indian J Gastroenterol*. 2012;31. doi:10.1007/s12664-012-0242-9.