

## Intestine Transplant

### Intestinal Failure, Rehabilitation and Transplantation

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Intestinal Transplantation has come a long way since its inception in the mid-sixties and popularization in the nineties of the last century. There were multiple interventions along the way that has paved the way to making intestinal transplantation not only a viable therapy for patients that qualify, but has forged a unique understanding of intestinal failure, gut rehabilitation procedures and treatments. This article focuses on these new tenets that have contributed to the success of Intestinal Transplantation.

#### Intestinal Failure:

This is the inability for the gut to maintain appropriate nutritional requirements and fluid and electrolyte requirements of the body.

Intestinal failure has 3 categories (1):

#### Type-1 Intestinal Failure:

This is mostly seen after major abdominal surgery, trauma where the intestine goes into prolonged ileus and can't be used for sustaining nutrition and fluid/electrolyte balance for the body. This phenomenon is typically self-limiting to a maximum of 30 days.

#### Type-2 Intestinal Failure:

This occurs when the intra-abdominal catastrophe is severe enough to cause disruption in the continuity of the gut and lead to entero-cutaneous fistulae and/or open abdomens with cocooning of the abdominal structures. This phenomenon contributes to most of intestinal failure patients that need specialist centers to take care of them.

#### Type-3 Intestinal Failure:

This is a situation where there is irreversible intestinal failure, and the patients will be on exogenous nutrition for life. Fifty percent of Type-2 intestinal failure patients will progress to Type-3 intestinal failure where the only real treatment option would be an intestinal transplant.

#### Gut Rehabilitation:

Gut rehabilitation is reserved for those patients with Type-2 intestinal failure who have enough length and quality of gut available, but, in discontinuity. This field has rapidly become one of the defining moments for the success of intestinal transplantation since it complements the specialty by weeding out patients that may not need a transplant and hence identifying the 'real' patients for transplantation.

Gut rehabilitation surgery is complex, and patients need to be referred to centers of excellence for this procedure. At these centers,(2) it is not only the surgeons that have the experience, but, the gastroenterologists, nutrition, Interventional Radiologists (IR) that quantify the level of malnourishment, engage in total parenteral nutrition (TPN), through expertly placed tunneled lines by an IR team.

A SNAP analysis will lead the patient to the surgeon for eventual gut rehabilitation surgery. SNAP is an acronym for Sepsis, Nutrition, Anatomy, and Plan. The patient is treated for sepsis; nutrition is the backbone of therapy; delineation of the anatomy left and then plan the next steps with a multi-disciplinary approach.

Fifty percent of Type-2 intestinal failure patients will benefit from gut rehabilitation surgery(2) and will be able to come off TPN. The rest will be considered to have irreversible intestinal failure where a transplant is the only option.

#### Intestinal Transplantation:

This is reserved for patients that fail gut rehabilitation or have a pathology that renders them short or ultra-short gut right from the beginning.

Intestinal Transplantation has 3 categories depending upon the anatomy of what needs to be transplanted.

#### 1. Isolated Intestinal graft (II):

Here the total small intestine with or without the right colon is transplanted. Traditionally these donors have come from cadaveric donors. There are some centers that are engaged in live donor intestinal transplant(3) especially in children where a total of 100-120 cm of intestine is harvested from an appropriate family member.

#### 2. Modified Multivisceral graft (MMVT):

Here the graft includes the stomach, pancreatico-duodenal segment and the whole small bowel with or without the right colon. This graft is from a cadaveric donor.

#### 3. Multivisceral Graft:

This is a MMVT including the Liver. The results of intestinal transplantation have shown a significant improvement over the last decade due to Alemtuzumab driven immunosuppression.(3) No maintenance steroids, cellular based therapies,(4) ability to close the abdomen with



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abdominal wall transplantation(5) and using sentinel skin flaps(6) from the same donor as a canvas to detect rejection much before it happens in the intestine are the other advances. Intestinal Failure, Gut Rehabilitation and Intestinal Transplantation in India:

These services are still in its infancy in India. What must be realized is that a center of excellence is defined by its ability to have all the 3 verticals described above that will make transplantation successful. Only a few hospitals in India offer such facilities, with MGM Healthcare in Chennai being one among them. Rigid protocols on nutritional assessment, line placement, line care, TPN team, and the surgical team governed by robust multi-disciplinary team approach can take these complex patients through to nutritional independence.

Perhaps a helping hand from the government may take care of the financial burden that engulfs this real therapy much like for liver and kidney transplantation.

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