

Transplant imaging in children

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Introduction

Transplantation has become an established treatment for many conditions and indeed is often the last resort for patient survival. The number of transplantations is increasing as improved surgical techniques, immunosuppression, and post-operative care have increased success rates. The common types

Table 11.1 Types of transplant

Autograft	Transplant of tissues/organ in the same person. Patient's own tissues are transplanted to another place
Allograft	Transplant of organ or tissue from a genetically nonidentical member of the same species e.g. human to human
Isograft	Subset of allograft. Transplant between genetically identical twins. Same as autograft in terms of recipient's immune response
Xenograft	Transplantation from one species to another e.g. porcine heart valve transplant
Split transplant	A single organ, e.g. liver, from a deceased donor can be split and transplanted into two recipients
Domino transplant	Sequential transplants – an organ from a deceased donor is transplanted into the first recipient. The first recipient's organ then is transplanted into a second recipient. For example, a donor's heart and lungs are transplanted into a second person whose heart, in turn, is transplanted into a third person. Domino transplant has been performed for liver as well
Orthotopic transplant	Diseased organ is removed and donor's organ is placed in that place, e.g. liver and heart transplants
Heterotopic transplant	Transplantation of an organ to a site that is different from the location that the organ would ordinarily occupy within the body. Diseased organ is usually not removed from the body, e.g. heart transplant and renal transplant

of transplant are reviewed in Table 11.1. The most common transplantation performed in children at our institution is bone marrow transplantation (approximately 100 cases per year). Commonly transplanted organs in children in decreasing order of frequency include kidney, liver, heart, lungs, bowel and pancreas (Table 11.2). With the increasing number of transplants of various organs come new challenges for the radiologist in terms of pre- and post-transplant imaging. Preoperative imaging is done to evaluate the potential donor to exclude any significant pathology and to obtain anatomical information for operative planning. Following transplantation, imaging is mainly performed to evaluate complications, which may be acute or chronic.

This chapter outlines principles of pre- and post-transplant imaging of organs such as liver, kidney, lung, heart, small bowel and bone marrow in children, with illustrative examples. Also discussed is post-transplantation lymphoproliferative disorder (PTLD), which can complicate any transplantation. Rejection of the transplanted organ or tissue occurs when the recipient's immune system attacks the transplant, causing damage to the organ, and can have systemic effects. Transplant rejection is one of the commonest complications but does not have specific radiological features.

Table 11.2 Commonly performed pediatric transplants

Organs	Sources of organ
Bone marrow	Living donor or autograft
Kidney	Deceased or living donor
Liver	Deceased or living donor
Heart	Deceased donor only
Enbloc heart and lung transplant	Deceased donor or domino transplant
Lung	Deceased or living donor
Intestine	Deceased or living donor
Pancreas	Deceased donor only