



UPDATE IN RADIOLOGY

What can happen after lung transplantation and the importance of the time since transplantation: Radiological review of post-transplantation complications[☆]



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Abstract Lung transplantation is the best treatment option in the final stages of diseases such as cystic fibrosis, pulmonary hypertension, chronic obstructive pulmonary disease, or idiopathic pulmonary fibrosis.

Better surgical techniques and advances in immunosuppressor treatments have increased survival in lung transplant recipients, making longer follow-up necessary because complications can occur at any time after transplantation.

For practical purposes, complications can be classified as early (those that normally occur within two months after transplantation), late (those that normally occur more than two months after transplantation), or time-independent (those that can occur at any time after transplantation). Many complications have nonspecific clinical and radiological manifestations, so the time factor is key to narrow the differential diagnosis.

Imaging can guide interventional procedures and can detect complications early. This article aims to describe and illustrate the complications that can occur after lung transplantation from the clinical and radiological viewpoints so that they can be detected as early as possible.

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PALABRAS CLAVE

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Radiografía de tórax

Qué puede pasar tras el trasplante pulmonar y la importancia del tiempo transcurrido. Revisión radiológica de las complicaciones postrasplante

Resumen El trasplante pulmonar es la mejor opción de tratamiento para los estadios finales de patologías como la fibrosis quística, la hipertensión pulmonar, la enfermedad pulmonar obstructiva crónica o la fibrosis pulmonar idiopática.

Una mejor técnica quirúrgica y el avance en las terapias inmunosupresoras aumentan la supervivencia de los receptores y hacen necesario un seguimiento más duradero, dado que las complicaciones pueden producirse en cualquier momento tras el trasplante.

Las complicaciones se dividen de forma práctica en agudas (dos primeros meses postrasplante), tardías (pasados 2 meses) y aquellas que pueden producirse en cualquier momento. Muchas de ellas presentan manifestaciones clínico-radiológicas inespecíficas, por lo que el criterio temporal es clave para acotar el diagnóstico diferencial.

Las pruebas de imagen permiten guiar procedimientos intervencionistas y detectar complicaciones precozmente. El objetivo del artículo es presentar las posibles complicaciones postrasplante desde un punto de vista clínico-radiológico con el fin de ser capaces de detectarlas lo antes posible.

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Introduction

Lung transplant in many cases is the only healing therapeutic option for advanced stages of diseases such as idiopathic pulmonary fibrosis, chronic obstructive pulmonary disease, cystic fibrosis or pulmonary hypertension. Based on the spread of parenchymatous damage caused by these entities, the transplant can be that of a single lung or both. The latter choice is necessary in cases of cystic fibrosis and pulmonary hypertension.

The significant increase in the number of transplant surgeries along with better immunosuppressive therapies increase survival and in turn the odds of coming across complications in image studies, whether derived from the surgical technique or immunosuppressive therapies.^{1,2}

The follow-up of lung transplant patients is carried out through chest X-rays and especially high resolution computed tomography (HRCT) performed at full inspiration using narrow slice widths <2 mm. At our center, it is performed a few days after transplant and then annually unless an intercurrent process makes it necessary to take these images modalities in between the usual controls. It will be necessary to administer IV contrast in cases suspected abnormalities in vascular anastomosis or pulmonary thromboembolism (PTE) and acquire one helix at full inspiration and another at expiration when we want to rule out obliterative bronchiolitis syndrome (OBS).

During the follow-up of these patients multiple complications can coexist showing overlapping both in the clinical manifestations and the form in which the image modalities present themselves. That is why they are divided in a practical way based on the time elapsed since the surgery, into acute, late and those that can occur at any post-transplant stage since time is a determining factor that allows us to establish differential diagnosis.³

The abnormalities associated with immunosuppressive therapies, recurrence of the primary disease, PTE and infections can occur at any postoperative stage (Fig. 1).

The monitoring of the lung function, the adjustment of immunosuppressive therapy and an early diagnosis of complications is key for the survival of transplant recipients. That is why it is necessary to follow a multidisciplinary approach in which the radiologist plays an important role. The goal of this article is to show the possible post-transplant complications from the clinical-radiological point of view in order to be able to find them as soon as possible.

Acute complications

Acute complications are considered those that appear during the first two months after surgery and they include reperfusion edema, pleural pathology, the graft acute rejection and mechanical complications due to mismatches in the size of the graft between the recipient and the dysfunction in anastomoses.

Reperfusion edema

It is a non-cardiogenic pulmonary edema that generally occurs during the first 24 h after surgery reaching its peak on the fourth day. It usually resolves at the end of the first week though can go on for up to three weeks.

Its etiology is diverse and very often inherent to the transplant technique itself so it is a complication that affects more than 95 per cent of transplanted patients. Ischemia in the donor's lung, manipulation of the graft and late reperfusion are among the main causes which cause an increase in capillary patency.

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