

# Approach to Transplant Infectious Diseases in the Emergency Department



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## KEYWORDS

- Solid organ transplantation • Hematopoietic cell transplantation
- Infectious diseases • Emergency department

## KEY POINTS

- Patients who have undergone solid organ transplantation or hematopoietic cell transplantation are medically complex and at high risk of infection.
- Transplant patients can present with subtle or atypical presentations of infection; therefore, emergency physicians must maintain a high index of suspicion for infection.
- The infectious differential for posttransplant patients is broad but can be guided by a timeline of immunosuppression.
- Patients who are critically ill or have potentially life-threatening infections should be managed and resuscitated appropriately and in a timely manner, through targeted laboratory testing and imaging, broad-spectrum antimicrobials, resuscitation, specialty consultation, and hospital admission.

## INTRODUCTION

Modern advances in solid organ transplantation (SOT) and hematopoietic cell transplantation (HCT), including breakthroughs in surgical technique and immunosuppression, have significantly improved survival and long-term clinical outcomes. As the multidisciplinary field of transplantation medicine continues to evolve and innovate,

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those who have undergone a transplant will continue to be some of the most medically complex and severely immunocompromised patients an emergency physician will care for in the emergency department (ED).

SOT is the surgical placement or replacement of a donated organ to address end-stage organ failure. In 2017, 34,770 SOTs were performed in the United States alone, a number that has continued to increase annually.<sup>1,2</sup> Although kidneys remain the most frequently transplanted organ to date, heart, liver, pancreas, lung, and intestinal transplantation have also become increasingly common over the past decade.<sup>2,3</sup>

HCT encompasses the introduction of hematopoietic progenitor cells to restore function to failing bone marrow or immune systems. It is performed for a wide range of indications, including leukemia, lymphoma, multiple myeloma, and certain nonmalignant diseases (eg, sickle cell disease, immunodeficiency diseases). In 2016, the most common indications for HCT in the United States were multiple myeloma and lymphoma, comprising 63% of all HCTs.<sup>4</sup> HCT is categorized by donor type (allogeneic vs autologous) and source of progenitor cells (bone marrow, peripheral blood, or umbilical cord blood). In allogeneic transplantation, hematopoietic cells are derived from a relative or unrelated donor. In autologous transplants, cells are harvested from a patient's own body. In 2015, 12,570 autologous HCTs, 3804 related donor allogeneic HCTs, and 4918 unrelated donor allogeneic HCTs were performed in the United States.<sup>5</sup>

EDs play a critical role in post-transplantation care.<sup>6</sup> At one high-volume transplant center, nearly 40% of abdominal organ transplant recipients sought ED care within 1 year after transplantation, with three-quarters of visits resulting in hospital admission.<sup>7</sup> In California, Florida, and New York, 57% of patients who underwent kidney transplantation visited an ED within the first 2 years after implant; almost half of these ED visits resulted in hospitalization.<sup>8</sup> Although ED utilization by HCT patients has not been well quantified, it is likely to be significant. Many similarities exist between SOT and HCT patients when it comes to the need for long-term immunosuppression, rendering both populations distinctly vulnerable to infectious diseases. Conversely, certain aspects also set these two populations apart. In this review, the authors provide emergency physicians with an approach to assessing transplant patients' underlying risk for infection, creating a broad differential of infectious diseases suited to that risk, and managing their initial infectious disease care in the ED.

## GENERAL PRINCIPLES

Infections are common in patients who have undergone SOT and HCT. Infections after SOT are often from surgical complications and later from chronic immunosuppression to prevent graft rejection. Infections after HCT relate to chemotherapy and sometimes the radiation used to eliminate the underlying malignancy and ensuing immunosuppression to prevent donor graft rejection. Depending on the depth of immunosuppression required, both SOT and HCT patients may be vulnerable to opportunistic pathogens, including viruses and fungi. Should SOT patients experience graft rejection or HCT patients develop graft-versus-host disease (GVHD), additional immunosuppression may be necessary, further increasing their susceptibility to infection. In GVHD, T cells present in the donor graft are activated, recognize the recipient (host) as foreign, and mount an immune reaction against host tissues (eg, skin, liver, gastrointestinal tract). Significant health care exposure at the time of and after transplantation also increases their risk of infection due to nosocomial pathogens.

Generally speaking, the risk of infection after SOT or HCT is greatest immediately after the procedure. Incidence of infection ranges anywhere from 25% to 80% during the critical first year following SOT.<sup>9</sup> Infection accounts for 20% of all deaths occurring

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