

## 10. HIV and solid organ transplant

### 10.1 Kidney/pancreas transplant

### 10.2 Liver/intestine transplant

### 10.3 Heart/lung transplant

### 10.4 Concurrent HBV/HCV

### 10.5 General/other

### 10.1 Kidney/pancreas transplant

Zarinsefat A, et al. (2022). Long-term Outcomes Following Kidney and Liver Transplant in Recipients With HIV. *JAMA surgery*, 157(3), 240–247. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/34985513/>

- Single-center, retrospective cohort study comparing long-term outcomes of HIV-positive patients who underwent kidney transplant and/or liver transplant patients with matched HIV-negative patients
- At 15 years posttransplant, HIV negative recipients had significantly higher patient survival, but graft survival was not significantly different. Diagnosis of HIV was not a statistically significant predictor of patient survival (HR, 1.36;95% CI, 0.83-2.24; p=0.22)
- Acute rejection was associated with reduced graft survival in HIV positive patients

Barday Z, et al. (2022). Retrospective Review of ART Regimens in HIV-Positive to HIV-Positive Kidney Transplant Recipients. *Kidney international reports*, 7(9), 2039–2046. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9459070/>

- Retrospective review describing ART regimens, reasons for ART switching, and association between rejection and protease inhibitor (PI)-based and non PI-based regimen in 53 HIV+ to HIV+ kidney transplant recipients in South Africa
- An association was found between rejection and PI-based regimen (incident rate ratio 2.77; 95% CI 1.03-7.48; p=0.044)

Adekunle R. O, et al. (2022). Early steps to kidney transplantation among persons with HIV and end-stage renal disease in ESRD network 6. *Transplant infectious disease: an official journal of the Transplantation Society*, 24(1), e13767. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/34813136/>

- Comparison of access to kidney transplantation between HIV+ and HIV- patients
- Patients living with HIV had longer times to referral, evaluation, and waitlisting after starting dialysis compared to HIV- patients

Cooper M, et al. (2021). Impact of protease inhibitor-based antiretroviral therapy on tacrolimus inpatient variability in HIV- positive kidney transplant recipients. *Transplant Proc*. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/33246588/>

- Comparison of protease inhibitor (PI)-based and non PI-based regimen on kidney transplant graft outcomes

Nambiar PH, Doby B, Tobian AAR, Segev DL, Durand CM. (2021). Increasing the donor pool: Organ transplantation from donors with HIV to recipients with HIV. *Annu Rev Med*. 72, 107-118. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/33502896/>

- Review article of HIV and transplantation that discusses outcomes in HIV D-/R+ transplantation and HIV D+/R+ deceased/living donor kidney transplantation.

Durand CM, et al. (2021) A prospective multicenter pilot study of HIV-positive deceased donor to HIV-positive recipient kidney transplantation: HOPE in action. *Am J Transplant*. 21(5), 1754-1764. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32701209/>

- Prospective multicenter study comparing HIV D+/R+ to HIV D-/R+ patients; Study did notice a trend towards higher rejection rates in the D+/R+ study group

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Alfano G, et al. (2020). Role of Maraviroc in minimizing the risk of graft rejection in HIV-infected kidney transplant recipients. *Transpl Infect Dis.* 22(4), e13294. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32294287/>

- Retrospective study comparing graft rejection in HIV positive kidney transplant recipients who received maraviroc therapy compared to maraviroc-free antiretroviral regimens; No difference of graft rejection was seen between groups

Alfano G, Fontana F, Guaraldi G, Cappelli G, Mussini C. (2020). Successful treatment of BK virus associated-nephropathy in a human immunodeficiency virus-positive kidney transplant recipient. *Int J STD AIDS.* 31(4), 387-391. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32075537/>

- Case report of a HIV positive kidney transplant recipient who achieved controlled BKV viremia by switching CN1 to sirolimus, discontinuing the steroid, and receiving a short course of leflunomide

Blasi M, et al. (2020). Detection of donor's HIV strain in HIV-positive kidney-transplant recipient. *N Engl J Med.* 382(2), 195-97. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/31914248/>

- Letter to editor outlining case where donor HIV strains are detected in HIV positive recipient post transplant.

Boyle SM, et al. (2020). Barriers to kidney transplant evaluation in HIV- positive patients with advanced kidney disease: A single-center study. *Transpl Infect Dis.* 22(2), e13253. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/31994821/>

- Retrospective study to characterize comorbidities, viral control and management, viral resistance, and KT evaluation appointment rates in a cohort of KT evaluation-eligible HIV-positive patients.

Katou S, et al. (2020). ABO-Incompatible living donor kidney transplantation in a human immunodeficiency virus-positive recipient from a human immunodeficiency virus-positive donor: A case report. *Transplant Proc.* 52(9), 2739-2741. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32771247/>

- First known case report of an ABO-incompatible kidney transplant between HIV+ donor to HIV+ recipient.

Mejia CD, Malat GE, Boyle SM, Ranganna K, Lee DH. (2020). Experience with a six-month regimen of *Pneumocystis pneumonia* prophylaxis in 122 HIV-positive kidney transplant recipients. *Transpl Infect Dis.* e13511. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/33217136/>

- 122 HIV-positive kidney transplant recipients at Hahnemann University Hospital received PCP prophylaxis for 6 months; After a median follow-up of 2.88 years, PCP did not occur in any of the recipients.

Akanit U, Bozorgmehri S, Alquadan K, Nelson J, Kaplan B, Ozrazgat-Baslanti T, Womer KL. (2020). Improved ability to achieve target trough levels with liquid versus capsule tacrolimus in kidney transplant patients with HIV on protease inhibitor- or cobicistat-based regimens. *Transpl Infect Dis.* 20, e13517. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/33217091/>

- Case series evaluating tacrolimus trough levels in 4 HIV kidney transplant recipients on PI or co-bi-based regimens who were converted from capsule formulation to liquid formulation tacrolimus.

Muller E, Botha FCJ, Barday ZA, Manning K, Chin-Hong P, Stock P. (2020). Kidney Transplantation in HIV Positive Patients: Current Practice and Management Strategies. *Transplantation.* Epub ahead of print. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/33044431/>

- Summary of HIV-recipient positive kidney transplant outcomes and management strategies from 19 cohort studies

Lai C, Anderson M, Davis R, Anderson L, Wyburn K, Chadban S, Gracey D. (2020). *Strongyloides* hyperinfection in an HIV-positive kidney transplant recipient: a case report. *BMC Infect Dis.* 20(1), 613. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32811453/>

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- Case report of HIV positive kidney recipient with strongyloides hyperinfection, not detected on serology; treated with ivermectin therapy

Werbel WA, Bae S, Yu S, Al Ammary F, Segev DL, Durand CM. (2020). Early steroid withdrawal in HIV-infected kidney transplant recipients: Utilization and outcomes. *Am J Transplant*. Epub ahead of print. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32681603/>

- Retrospective analysis using SRTR data to evaluate utilization and outcomes of ESW in HIV positive kidney recipients; ESW use was more common with zero HLA mismatch, living donors, and lymphodepleting induction; Acute rejection was more common in the ESW group at 1 year.

Santeusano A, et al. (2020). Conversion to belatacept maintenance immunosuppression in HIV-positive kidney transplant recipients. *Clin Transplant*. 34(10), e14041. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32654239/>

- Retrospective review of short-term allograft and HIV-related outcomes following belatacept conversion in 10 HIV positive kidney recipients

Malat GE, et al. (2019). Kidney Transplantation in HIV-Positive Patients: A Single-Center, 16-Year Experience. *Am J Kidney Dis*. 73(1), 112-118. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/29705074/>

- Single center 16-year retrospective review of kidney transplantation in HIV-positive individuals assessing associations of antiretroviral therapy with long-term survival, cellular and antibody-mediated rejection rates, and the causes of allograft failure.

Touret J, et al. (2019). Access to the waiting list and to kidney transplantation for people living with HIV: A national registry study. *Am J Transplant*. 19(12), 3345-3355. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/31206243/>

- A French national registry study evaluating access to the waiting list and kidney transplantation in 255 HIV-positive individuals noting delayed and reduced frequency in transplantation (HR 0.75, 95% CI, 0.52-1.10).

Alfano G, et al. (2019). Antiviral activity of sirolimus in an HIV-positive kidney transplant recipient. *International Journal of STD & AIDS*, 30(9), 919-922. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/31280689/>

- Case report of the antiviral effects of sirolimus in an HIV-positive kidney transplant recipient who experienced low-level HIV-1 replication reporting stable graft function with monotherapy immunosuppression.

Matignon M, et al. (2019). Low incidence of acute rejection within 6 months of kidney transplantation in HIV-infected recipients treated with raltegravir: the Agence Nationale de Recherche sur le Sida et les Hépatites Virales (ANRS) 153 TREVE trial. *HIV Med*. 20(3), 202-213. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/30688008/>

- Prospective, multicenter single-arm trial in 61 adult patients living with HIV who undergo kidney transplantation aiming to evaluate 6-month clinical acute rejection rates in patients treated with raltegravir, effective HIV therapy and time to transplantation.

Zheng X, et al. (2019). Kidney transplant outcomes in HIV-positive patients: a systematic review and meta-analysis. *AIDS Res Ther*. 16(1), 37. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/31747972/>

- Meta-analysis and systematic review of 27 cohort studies and 1670 case series published between July 2003 and May 2018

Muller E, Barday Z. (2018). HIV-Positive Kidney Donor Selection for HIV-Positive Transplant Recipients. *J Am Soc Nephrol*. 29(4), 1090-1095. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/29330339/>

- Retrospective study characterizing donor selection of 43 kidneys from 25 HIV-positive deceased donors have been transplanted into patients who are HIV positive in Cape Town, South Africa.

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Taege, AJ. (2018). Human immunodeficiency virus organ transplantation. *Infectious Disease Clinics* 32.3 (2018): 615-634. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/30146026/>

- Overview of the transplantation needs in the HIV population focusing on kidney and liver transplants discussing rejection rates, hepatitis C coinfection, and new donor pool opportunities with HIV(+) donor to HIV(+) recipient donation.

Cristelli MP, et al. (2018). Sexual acquisition of HIV infection after solid organ transplantation: Late presentation and potentially fatal complications. *Transpl Infect Dis.* 20(4), e12894. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/29603514/>

- Case series of nine HIV infected SOT patients (8 kidneys, 1 heart); 6/9 patients contracted disease within 5 years of transplant attributed to sexual acquisition; in 7/9 patients, virologic response and CD4 recovery were achieved within 3 months after starting antiretroviral therapy.

Apewokin S, Madan R, Restrepo A, Hemmige VS, Arora S. (2018). Clinical and health care utilization outcomes of kidney transplantation in HIV-positive recipients: A nationwide analysis from 2008-2013. *Transplant Proc.* 50(10), 3361-3366. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/30577208/>

- United States nationwide analysis evaluating the effectiveness of kidney transplantation in 605 HIV-positive recipients by reporting clinical and health care utilization outcomes including infection rates, in-hospital mortality rates, and hospital charges.

## 10.2 Liver/intestine transplant

Di Sandro S, Catellani B, Guidetti C, et al. (2023) Successful living donor liver transplantation from an HIV and HCV positive donor: report from the first case in the world [published online ahead of print, 2023 Mar 6]. *AIDS.* 2023;10.1097/QAD.0000000000003533. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/36927959/>

- Case report of the first know LDLT from a donor with history of both HIV and HCV infection. The recipient was a 60 year old male with HIV and ESLD caused by HCV/HBV/HDV co-infection. Patient has been appropriately treated for HCV and achieved SVR, and has well-controlled HIV, HBV, and HDV on a regimen of bicitgravir/tenofovir alafenamide/emtricitabine. His donor was his wife, who tested positive for HIV and HCV. She also previously achieved SVR, and her HIV was well controlled. The transplant was successful, with maraviroc added to the recipient's regimen post-transplant.

Fan X, Fang J, Wu X, et al. (2022). Effect of HIV infection on pre- and post-liver transplant mortality in patients with organ failure. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/33964108/>

- Cross-sectional study and retrospective cohort study using the US National Inpatient Sample (NIS) and the United Network for Organ Sharing (UNOS) registry data. 201,348 patients from the NIS were included, and the analysis found that one, two, or three or more organ failures were associated with higher pre-liver transplant (LT) mortality in HIV-infected patients compared to HIV-negative patients with the corresponding number of organ failures.
- UNOS data found that in HIV-infected patients the presence of two or more organ failures was associated with higher 1 year mortality in HIV-infected patients compared to HIV-negative patients, but in patients with no organ failure or only one organ failure, HIV status did not impact 1 year mortality post-LT.

Kumar R, Stosor V. (2022). Advances in Liver Transplantation for Persons with Human Immunodeficiency Infection. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8922075/>

- Review of current landscape of LT for persons living with HIV highlighting the impact of direct-acting antiviral HCV therapies on the epidemiology of liver disease and posttransplant outcomes in HIV-HCV co-infected recipients, improvements in posttransplant management of liver recipients with HIV, and expanding opportunities for persons with HIV as organ donors and recipients with the use of HIV positive livers for transplantation.

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- Liver transplant outcomes have improved in persons with HIV-hepatitis C co-infection persons with HIV. Preliminary results of HIV-to-HIV liver transplantation show acceptable results although rates of post-transplant infections and malignancies are areas of concern

Durand, C. M., et al. (2022). HOPE in Action Investigators (2022). HOPE in action: A prospective multicenter pilot study of liver transplantation from donors with HIV to recipients with HIV. *Am J Transplant*, 22(3), 853–864. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/34741800/>

- Prospective, multicenter pilot study comparing HIV D+/R+ to HIV D-/R+ liver transplantation
- There were no differences in 1 year graft survival, rejection, or HIV breakthrough but HIV D+/R+ patients had more opportunistic infections, infectious hospitalizations, and cancer

Rossotti R, Merli M, Mazzarelli C, et al. (2022). Similar survival but higher and delayed hepatocellular carcinoma recurrence in HIV-positive compared to negative cirrhotics undergoing liver transplantation [published online ahead of print, 2022 May 26]. *Dig Liver Dis*. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/35644890/>

- Retrospective evaluation of 299 liver transplant patients including 31 HIV positive recipients
- Increased but delayed HCC recurrence was found in HIV positive patients compared to HIV negative patients suggesting that surveillance protocols may need to be adjusted in this population

Campos-Varela I, Dodge JL, Terrault NA, Brandman D, Price JC, et al. (2021). Non-viral liver disease is the leading indication for liver transplant in the U.S. in persons living with human immunodeficiency virus. *Am J Transplant*. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/33749113/>

- Retrospective review of 62,195 liver transplant recipients between 2008 and 2019 who were identified from United Network for Organ Sharing and Organ Procurement and Transplantation Network data. Analysis showed that there was an increase in utilization of HIV infected recipients over time, with an average annual percentage increase of 9.2%. Graft and patient survival increased over the study period as well.
- A sub analysis of HCV-infected liver transplant recipients from 2014-2018 showed no significant difference in patient or graft survival between HIV infected and uninfected recipients. Non-viral liver disease was identified as the leading cause of liver transplant in the United States in HIV-infected patients.

Henrich TJ, et al. (2020). Everolimus, an mTORC1/2 inhibitor, in ART-suppressed individuals who received solid organ transplantation: A prospective study. *Am J Transplant*. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32780519/>

- Prospective trial examining the impact of everolimus on HIV persistence and immune responses; Outcomes did not show a significant effect on cell-associated HIV-1 DNA and RNA levels with the use of everolimus in the entire cohort, however, there were significantly lower RNA levels up to 6 months post intervention in patients who had everolimus time-averaged trough levels >5 ng/mL within the first two months of therapy

Campos-Varela I, et al. (2020). Temporal trends and outcomes in liver transplantation for recipients with HIV infection in Europe and United States. *Transplantation*, 104(10), 2078-2086. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32969987/>

- Comparison of HIV positive liver transplant recipients between 2008-2015 in Europe and the United States to HIV negative recipients; Improvement of patient and graft survival in HIV-infected liver transplant recipients was observed over time.

Franceschini E, et al. (2020). Efficient T cell compartment in HIV+ patients receiving orthotopic liver transplant and immunosuppressive therapy. *J Infect Dis*. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32620016/>

- Evaluation of changes in T cell phenotype and polyfunctionality in patients with or without HIV infection receiving liver transplant

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Cattaneo D, et al. (2020). Dolutegravir-based antiretroviral regimens for HIV liver transplant patients in real-life settings. *Drugs R D.* 20(2), 155-160. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32189238/>

- Review of 10 liver transplant recipients who received dolutegravir based HIV therapy post transplantation

Righi E, Ivaldi F, La Rosa A, Carnelutti A, Londero A, Bassetti A. (2019). Immunological profiles of HIV-positive recipients of liver transplant. *Transpl Immunol.* 57, 101208. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/31102654/>

- Characterization of T cells and NK cells subsets in HIV positive liver transplant recipients and HIV negative liver transplant recipients

Baccarani U, et al. (2019). Early post-liver transplant surgical morbidity in HIV-infected recipients: risk factor for overall survival? A nationwide retrospective study. *Transpl Int.* 32(10), 1044-52. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/31050044/>

- Retrospective study to identify risk factors associated with early relaparotomies and its impact on overall survival in HIV infected liver transplant recipients.

Crismale JF, Ahmad J. (2019). Expanding the donor pool: Hepatitis C, hepatitis B and human immunodeficiency virus-positive donors in liver transplantation. *World J Gastroenterol.* 25(47), 6799-6812. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/31885421/>

- Review of literature for HCV and HIV positive liver transplant recipients

Waldman G, et al. (2019). Successful optimization of antiretroviral regimens in treatment-experienced people living with HIV undergoing liver transplantation. *Transpl Infect Dis.* 21(6), e13174. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/31520554/>

- Case series of 3 liver transplant recipients who were transitioned to integrase non-strand transfer inhibitor containing regimens post-transplant to avoid drug interactions with previous regimen and immunosuppression

Cappelletti A, et al. (2019). Recurrent posterior reversible encephalopathy syndrome in an HIV-HCV coinfecting liver transplant recipient. *AIDS.* 33(10), 1679-1681. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/31305337/>

- Case report of a 49-year old HIV-positive male patient who underwent liver transplantation with subsequent development of PRES assessing accurate risk stratification and management.

Botha J, et al. (2018). Living donor liver transplant from an HIV-positive mother to her HIV-negative child: opening up new therapeutic options. *AIDS.* 32(16), F13-F19. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/30281558/>

- Case report of a living donor liver from an HIV-positive mother to her HIV-negative child in South Africa showing recipient seroconversion 43 days posttransplant and undetectable antibody titers at one year.

Hemmersbach-Miller M, Berg CL, Messina JA, Wolfe CR. (2018). Transplant drug interactions and a word of caution for the HIV provider. A case report. *Open Forum Infect Dis.* 5(4), ofy070. <https://pubmed.ncbi.nlm.nih.gov/29713654/>

- Case report demonstrating acute liver rejection in an HIV-positive recipient due to a failure to recognize the loss of protease inhibitor interaction with maintenance immunosuppressive regimen.

### 10.3 Heart/Lung Transplant

Hemmige V, Saeed O, Puius YA, et al. (2023) HIV D+/R+ heart/kidney transplantation: First case report. *J Heart Lung Transplant.* 2023;42(3):406-408. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/36588051/>

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- Case report of the world's first HIV D+/R+ heart transplant, performed as a heart/kidney transplant. Recipient was a middle-aged female with FSGS and a 3-decade history of HIV, well controlled on rilpivirine and dolutegravir. The patient was originally listed for a kidney transplant alone, after which LVEF declined to 20% and a heart transplant was deemed necessary. The patient was treated with basiliximab, tacrolimus, mycophenolate, and steroids. At 90 days post-transplant, patient was doing well with eGFR 90 mL/min/BSA and no evidence of cardiac or renal allograft dysfunction.

Osobamiro O, et al. (2022). Cardiac transplantation in people living with HIV: the global context. *Heart*. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/35140108/>

- Focuses on the role of cardiac transplantation for people who live with HIV (PLWH), with special emphasis on the global context.
- While there are significantly fewer heart transplants among PLWH, small case studies have shown that, as with the kidney/liver populations, the 5-year survival between PLWH and HIV-negative patients undergoing heart transplantation was similar. In addition to similar challenges around ideal immunosuppressive regimens, increased risk of rejection and challenges in equitable transplantation workup, PLWH heart recipients also struggle with a scarcity of available transplantation centres equipped for cardiac transplantation for this vulnerable patient population.

Wairimu F, Ward NC, Liu Y, Dwivedi G. (2021). Cardiac transplantation in HIV positive patients: a narrative review. *J Acquir Immune Defic Syndr*. Epub ahead of print. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/33534274/>

- Narrative review of studies published through September 2020 on cardiac transplantation in patients with HIV; Short-term survival is comparable to the general population and HIV status remains stable with post-organ transplantation immunosuppression; Immunosuppression doses are not recommended to be reduced over long-term follow-up due to higher rates of cellular rejection in HIV positive patients.

Brozzi NA, Simkins J, Cifuentes RO, Ghodsizad A, River NT, Loebe M. (2020). Advanced heart failure therapies in patients with stable HIV infection. *J Card Surg*. 35(4),908-911. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32048338/>

- Case report of LVAD and heart transplant in patient living with HIV and review of current field

Pola-Dos-Reis F, Aranha Camargo LF, Afonso-Junior JE, Somano MS, Pego-Fernandes PM. (2020). First lung transplant in a HIV patient in Brazil. *Braz J Infect Dis*. 24(3), 268-269. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32553467/>

- Case report of first lung transplant in patient living with HIV in Brazil.

Doberne JW, Jawitz OK, Raman V, Bryner BS, Schroder JN, Milano CA. (2020). Heart transplantation survival outcomes of HIV positive and negative recipients. *Ann Thorac Surg*.S0003-4975(20), 31484-3. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32946847/>

- Using data from UNOS dataset, outcomes between HIV positive and negative heart transplants were compared; Rate of acute rejection was significantly higher in the HIV-positive group and there was no difference in short and moderate term survival between HIV positive and HIV negative recipients.

Peters LL, Ambardekar AV. (2020). An immunosuppression tightrope: Successful heart transplantation after giant cell myocarditis in a patient with HIV complicated by recurrent giant cell myocarditis and Kaposi sarcoma. *J Heart Lung Transplant*.S1053-2498(20), 31761-7. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/33067104/>

- Case report of a HIV positive heart transplant recipient with giant cell myocarditis

Sénéchal I, Châteauvert N, Gervais P, Voisine P, Dubois M, Sénéchal M. (2020). Complex drug interactions in an HIV-seropositive heart transplant recipient. *Turk Kardiyol Dern Ars*. 48(2), 180-184. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32147653/>

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- Case report discussing drug interactions present in heart transplant recipient living with HIV over 11 years of follow-up

Koval CE, et al. (2019). Heart or lung transplant outcomes in HIV-infected recipients. *J Heart Lung Transplant.* 38(12), 1296-1305. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/31636044/>

- Multicenter retrospective study of 29 HIV infected thoracic transplant recipients from 2000-2016; At 1 year, a rejection rate of 62% was observed for heart transplant recipients

Chen C, Wen X, Yadav A, Belviso N, Kogut S, McCauley J. (2019). Outcomes in human immunodeficiency virus-infected recipients of heart transplants. *Clin Transplant.* 33(1), e13440. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/30387534/>

- Retrospective study comparing outcomes of 35 heart transplantations between HIV-positive and HIV-negative recipients using SRTR transplant registry data reporting no difference in patient survival, overall graft survival and death-censored graft survival in HIV-positive and HIV-negative heart transplant recipients.

Ambaraghassi G, Ferraro P, Poirier C, Rouleau D, Fortin C. (2019). Double lung transplantation in an HIV-positive patient with *Mycobacterium kansasii* infection. *Transpl Infect Dis.* 21(1), e12999. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/30203904/>

- Case report of a double lung transplant in a 50-year old HIV-positive patient with alpha-1 antitrypsin deficiency with a history of *mycobacterium kansasii* prior to transplant reporting stable graft function at 15-months posttransplant without initiation of *mycobacterium* therapy.

Zhou X, et al. (2019). Disseminated intravascular coagulation following heart transplant in an HIV-infected recipient: Case report and review of the literature. *Transplant Direct.* 5(5), e444. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/31165079/>

- Case report of a 48 year-old HIV-positive male patient who underwent heart transplantation from an HIV-negative donor complicated by disseminated intravascular coagulation.

Ong, S et al. (2018). Successful lung transplantation in an HIV seropositive patient with desquamative interstitial pneumonia: a case report. *BMC Pulmonary Medicine,* 16(1), 162. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/30326889/>

- Case report of a 48-year old HIV-positive male who underwent successful bilateral lung transplantation in Canada discussing posttransplant HIV management, rejection & infection outcomes, and functional status at one year.

Rouzaud C, Berastegui C, Picard C, et al. Lung Transplantation in HIV-Positive Patients: A European Retrospective Cohort Study. *Eur Respir J.* 2022;60(10):2200189. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/35595318/>

- Retrospective cohort study in HIV-positive patients receiving a lung transplantation.

#### 10.4 Concurrent HBV/HCV

Molarn MZ, Potluri VS, Schaubel DE, et al. Association of donor hepatitis C virus infection status and risk of BK polyomavirus viremia after kidney transplantation. *Am J Transplant.* 2022;22(2):599-609. Retrieved from <https://pubmed.ncbi.nlm.nih.gov/34613666/>

- Retrospective cohort at four centers - matched recipients of HCV-viremic kidneys to highly similar recipients of HCV-aviremic kidneys on established risk factors for BKPyV. The primary outcome was BKPyV viremia  $\geq 1000$  copies/ml or biopsy-proven BKPyV nephropathy; a secondary outcome was BKPyV viremia  $\geq 10\ 000$  copies/ml or nephropathy.
- The median days to peak BKPyV viremia level was 119 (IQR 87-182). HCV-viremic KT was not associated with increased risk of the primary BKPyV outcome (HR 1.26,  $p = .22$ ), but was

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significantly associated with the secondary outcome of BKPyV  $\geq 10\ 000$  copies/ml (HR 1.69, p = .03)

Rendina M, Paoletti E, Labarile N, et al. HCV-positive kidney transplant patients treated with direct-acting antivirals maintain stable medium-term graft function despite persistent reduction in tacrolimus trough levels. *Ther Adv Chronic Dis.* 2022;13:20406223221117975. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/36147292/>

- Double-center retrospective study with a prospective follow-up enrolled 35 KTRs with HCV treated with DAAs for 12 weeks. We compared three parameters: estimated glomerular filtration rate (eGFR), 24-h proteinuria, and CNI trough levels at three time points: baseline, end of treatment (EOT), and 12 months later.
- Kidney allograft function remained stable when comparing baseline and 12-month post-treatment values of eGFR (60.7 versus 57.8 ml/min;  $p = 0.28$ ) and 24-h proteinuria (0.3 versus 0.2 g/24 h;  $p = 0.15$ ), while tacrolimus (Tac) trough levels underwent a statistically significant decline (6.9 versus 5.4 ng/ml;  $p = 0.004$ ).

Alghamdi W, Lotfy K, Weernink C, et al. Hepatitis C positive organ transplantation to negative recipients at a multiorgan Canadian transplant centre: ready for prime time. *BMC Gastroenterol.* 2022;22(1):34. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/35078405/>

- Retrospective review of anti-HCV NAT positive and negative organs into negative recipients transplanted over 27 months. Primary outcome was the success rate of eradication of HCV post-transplant. Secondary outcomes were rate of transmission of HCV, treatment adverse events, and graft failure
- 33 anti-HCV positive organs were transplanted into negative recipients. 22 (66.7%) were NAT positive. The median time to initiating therapy was 41.5 days. SVR12 was 100% in patients who finished therapy. There were no adverse events with therapy and no graft failure.

Lushniak LA, Durand CM. Donors with human immunodeficiency virus and hepatitis C for solid organ transplantation: what's new. *Curr Opin Infect Dis.* 2022;35(4):321-329. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/35849522/>

- Passage of the HOPE Act and the advent of direct-acting antiviral (DAA) therapies have allowed for expansion of the donor organ pool to include donors with human immunodeficiency virus (HIV) and hepatitis C virus (HCV), thus providing new opportunities for waitlist candidates. This article provides updates on recent studies in solid organ transplantation (SOT) utilizing donors with HIV and HCV.
- With recent findings of good outcomes in both HIV D+/R+ and HCV D+/R- SOT, we feel the evidence supports both practices as standard clinical care options to mitigate organ shortage and reduce waitlist mortality.

Hidaka M, Eguchi S, Hasegawa K, et al. (2023) Impact of sustained viral response for hepatitis C virus on the outcomes of liver transplantation in hemophilic patients with human immunodeficiency virus/hepatitis C virus co-infection: A nationwide survey in Japan. *Hepatol Res.* 53(1):18-25. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/36002995/>

- Retrospective cohort study of liver transplant recipients in Japan between 1997 and 2019 with concomitant HIV and HCV infection. A total of 17 patients met inclusion criteria; 12 receiving allografts from living donors and 5 from deceased donors. All participants were diagnosed with hemophilia. The greatest impact seen on outcomes was achievement of SVR.

Jacob J, Shaikh A, Goli K, et al. (2022). Improved Survival After Liver Transplantation for Patients With Human Immunodeficiency Virus (HIV) and HIV/ Hepatitis C Virus Coinfection in the Integrase Strand Transfer Inhibitor and Direct-Acting Antiviral Eras. *Clin Infect Dis.* Oct 12:ciac821. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/36221143/>

- Retrospective analysis of adults with HIV monoinfection and HIV/HCV coinfection who received liver transplant (LT) comparing mortality in patients with HIV who received LT before versus after

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the approval of integrase strand transfer inhibitors (INSTIs) and in patients with HIV/HCV coinfection who received LT before versus after approval of direct acting antivirals (DAAs). LT recipients with HIV mono-infection did not experience significant improvement in survival between the pre- and post-INSTI eras. Recipients with HIV/HCV coinfection in the DAA era had a 47% reduction in 1-year mortality as compared to the pre-DAA era.

McCain J, Chascsa D. (2022). Special Considerations in the Management of HIV and Viral Hepatitis Coinfections in Liver Transplantation. *Hepat Med. Apr 29;14:27-36*. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/35514530/>

- Review article of the treatment of HIV and viral hepatitis coinfections in liver transplantation

Shimada S, Ivanics T, Kitajima T, et al. (2022). Improvements in liver transplant outcomes in patients with HCV/HIV coinfection after the introduction of direct-acting antiviral therapies. *Transpl Infect Dis. Apr;24(2):e13808* Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/35157334/>

- Retrospective review of liver transplant (LT) recipients with HCV and/or HIV in the pre-direct acting antiviral (DAA) era (2008-2012) compared to the post-DAA era (2014-2019) who were identified from United Network for Organ Sharing (UNOS) and Sharing and Organ Procurement and Transplantation Network (OPTN) data. HCV/HIV coinfecting and HCV mono-infected patients had a lower hazard of 1- and 3-year graft loss in the post-DAA era. The hazards of 1- and 3-year graft loss in HIV mono-infected individuals were comparable in both eras. HCV/HIV coinfection had significantly lower mortality in the post-DAA era.

Peters M, Kottlil S, Terrault N, et al. (2021). Retrospective-prospective study of safety and efficacy of sofosbuvir-based direct-acting antivirals in HIV/HCV coinfecting participants with decompensated liver disease pre- or post-liver transplant. *Am J Transplant. May;21(5):1780-1788*. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8096639/>

- Multicenter prospective and retrospective, open-label study using sofosbuvir-based DAA therapy to treat HIV/HCV-coinfecting patients pre- or post-liver transplant (LT). Of the 68 patients included, 42 participants were pre-LT and 26 were post-LT. Ninety-three percent of patients achieved a sustained virologic response. Despite HCV cure, 12 pre-LT patients required transplant for decompensated liver disease. Overall, transplant free survival was 42.8% and post-LT survival was 87.9% at 5 years.

Cotter T, Wang J, Lieber S, et al. (2021). "Raising HOPE": Improved Outcomes for HIV/HCV-coinfecting Liver Transplant Recipients in the Direct-acting Antiviral Era. *Transplant Direct. 2021 Jun 8;7(7):e707*. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8191686/>

- Retrospective review of 73,581 liver transplant (LT) recipients between 2008 and 2020 who were identified from United Network for Organ Sharing (UNOS) and Sharing and Organ Procurement and Transplantation Network (OPTN) data. LT increased in the direct-acting antiviral (DAA) era from 28 in 2014 to 64 in 2019, 23 of which were HIV/HCV coinfecting. In the pre-DAA era, HIV/HCV coinfection was associated with increased risk of graft failure compared to non-infected individuals. However, in the post-DAA era, there is no significant difference in graft failure amongst HIV/HCV coinfecting individuals compared to their non-infected counterparts.

Boyersky BJ, Strauss AT, Segev DL. (2021). Transplanting organs from donors with HIV or hepatitis C: The viral frontier. *World J Surg. Epub ahead of print*. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/33471156/>

- Review article of transplantation of donors with HIV or HCV

Delman AM, Ammann AM, Shah SA. (2021). The current status of virus-positive liver transplantation. *Curr Opin Organ Transplant. Epub ahead of print*. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/33595981/>

- Review article of the transplantation of hepatitis C virus (HCV), hepatitis B virus (HBV) and HIV-positive livers.

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Farmakiotis D, et al. (2020). Successful kidney transplantation in a recipient coinfecting with hepatitis C genotype 2 and HIV from a donor infected with hepatitis C genotype 1 in the direct-acting antiviral era. *Case Reports Hepatol.* 2020, 7679147. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32082657/>

- Case report of kidney transplant recipient co-infected with HCV (genotype 2a)/HBV/HIV

Moreno-Ramirez M, et al. (2020). Direct-acting antiretroviral therapy in renal transplant recipients with human immunodeficiency virus-hepatitis C virus coinfection: Report of our experience and literature review. *Transplant Proc.* 52(2), 523-526. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32035678/>

- Case series of 6 HIV/HCV co-infected kidney transplant recipients from 2001-2018

Yamamoto H, et al. (2020). Living donor domino liver transplantation in a hepatitis C virus/human immunodeficiency virus-coinfecting hemophilia patient: a case report. *Surg Case Rep.* 6(1), 184. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32728812/>

- Case report of HIV positive liver transplant recipient (with CD4 52 and VL ND at the time of transplant) who had recurrence of HCV on POD 34

Peters MG, et al. (2020). Retrospective-prospective study of safety and efficacy of sofosbuvir based direct acting antivirals in HIV/HCV coinfecting participants with decompensated liver disease pre or post liver transplant. *Am J Transplant.* Epub ahead of print. Retrieved from:

<https://pubmed.ncbi.nlm.nih.gov/33277801/>

- Multicenter, prospective and retrospective study evaluating sofosbuvir therapy in 42 pre and 26 post liver transplant recipients. 93% of patients achieved SVR and post liver transplant survival was 87.9% at 5 years.

Spagnuolo V, Uberti-Foppa C, Castagna A. (2019). Pharmacotherapeutic management of HIV in transplant patients. *Expert Opinion on Pharmacotherapy*, 20(10), 1235-1250. Retrieved from:

<https://pubmed.ncbi.nlm.nih.gov/31081726/>

- Review overview of transplantation in patients living with HIV, with focus on the management of combination antiretroviral therapy in this population including patients with HCV and HIV.

Shelton BA, et al. (2019). Optimal timing of hepatitis C treatment among HIV/HCV coinfecting ESRD patients: Pre- vs posttransplant. *Am J Transplant.* 19(6), 1806-1819. Retrieved from:

<https://pubmed.ncbi.nlm.nih.gov/30589503/>

- Monte Carlo microsimulation model of HCV infection and kidney transplantation amount coinfecting kidney-only transplant candidates to estimate the cost-effectiveness of pre- vs post-transplant therapy.

Jones JM, et al. (2019). Quantifying the risk of undetected HIV, hepatitis B virus, or hepatitis C virus infection in Public Health Service increased risk donors. *Am J Transplant.* 19(9), 2583-2593. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/30980600/>

- Monte Carlo simulation performed to assess the risk of HIV, HBV and HCV transmission through organ transplantation with parameters including risk of disease acquisition for increased risk groups, number of virions that multiply to establish infection, virus doubling time, and limit of detection by NAT.

## 10.5 General/Other

Lam C, Landry S, Moussa G, et al. Pharmacotherapeutic interventions in people living with HIV undergoing solid organ transplantation: a scoping review. *Transplant Direct.* 2023;9(2):e1441. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/36733439/>

- Review of 209 studies from Jan 2010 to Feb 2020 describing pharmacotherapeutic interventions in people living with HIV considered for or undergoing SOT. The majority of interventions surrounded induction and maintenance immunosuppression, immunizations, and ART adjustments.

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Zha J, Jian Qi, Yao B, et al. (2022). Effects of a ritonavir-containing regimen on the pharmacokinetics of sirolimus or everolimus in healthy adult subjects. *Pharmacol Res Perspect*. 2022;10:e01024. Retrieved from: <https://bpspubs.onlinelibrary.wiley.com/doi/full/10.1002/prp2.1024>

- Phase 1 study evaluating the pharmacokinetics, safety, and tolerability of the co-administration of sirolimus or everolimus with ritonavir-containing 3D regimen of the direct-acting antiviral agents ombitasvir, ritonavir-boosted paritaprevir, and dasabuvir in healthy subjects

Werbel W, Brown D, Kusemiju O, et al. (2021). National Landscape of Human Immunodeficiency Virus—Positive Deceased Organ Donors in the United States. *Clin Infect Dis*. 2022 Jun 1; 74(11): 2010–2019. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/34453519/>

- Prospective study of donors with HIV-positive and HIV false-positive test results that found that the use of HIV-positive donors increased annually, and major HIV drug resistance mutations were detected in 42% of patients, but only 4% compromise integrase strand transfer inhibitors.

Van Pilsum Rasmussen S, Seaman S, Johnson M, et al. (2021). Patients' Experiences With HIV-positive to HIV-positive Organ Transplantation. *Transplant Direct*. 2021 Sep; 7(9): e745. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8352618/>

- Interviews of kidney and liver transplant recipients enrolled in clinical trials evaluating HIV D+/R+ transplantation that identified that patients had overall positive experiences. Ethical concerns, such as targeted education for HIV-positive candidates, remain to be addressed.

de Sandes-Freitas TV, et al. (2021). The Unpredictable outcome of SARS-CoV-2 in kidney transplant recipients with HIV-infection. *Transplantation*, 105(1), e9-e10. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/33350631/>

- Case series of the characteristics and management of 8 HIV-infected kidney transplant recipients with COVID-19

Santeusano AD, et al. (2021). Influence of patient characteristics and immunosuppressant management on mortality in kidney transplant recipients hospitalized with coronavirus disease 2019 (COVID-19). *Clin Transplant*. e14221. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/33421213/>

- Retrospective review of kidney transplant recipients admitted with COVID-19, which found that concomitant HIV infection was associated with increased mortality (87.5% vs 36.1%,  $p < 0.01$ ).

Mehta SA, et al. (2021). Incidence and outcomes of COVID-19 in kidney and Liver Transplant Recipients With HIV: Report From the National HOPE in Action Consortium. *Transplantation*. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/33165238/>

- Evaluation of treatment and outcomes of COVID-19 in 11 transplant recipients infected with HIV

Mahale, P, et al. (2021). Anaplastic large cell lymphoma in human immunodeficiency virus-infected people and solid organ transplant recipients. *Br J Haematol*, 192, 514-521. Retrieved from: <https://doi.org/10.1111/bjh.16778>.

- Case series of 121 incident ALCL cases in HIV ( $n=86$ ) and transplant ( $n=35$ ) populations. ALCL risk was elevated in both HIV (SIR 5.43; CI 4.27-6.81) and transplant (SIR 5.96; 4.03-8.49) populations. Risk of ALCL was highest in the first year and after 10 years out from transplant in the solid organ transplant population. Only 12.5% HIV and SOT cases tested positive for Epstein Barr virus, suggesting that ALCL risk may not related to EBV infection.

Jones JM, et al. (2020). Assessing solid organ donors and monitoring transplant recipients for human immunodeficiency virus, hepatitis B virus, and hepatitis C infection – U.S. Public Health Service guideline, 2020. *MMWR Recomm Rep*. 69(4), 1-16. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32584804/>

- Revised version of the 2013 PHS guideline for assessing transplant donors and monitoring recipients for HIV, HBV, and HCV.

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Nel JS, et al. (2020). Southern African HIV Clinicians Society guidelines for solid organ transplantation in human immunodeficiency virus: An evidence-based framework for human immunodeficiency virus-positive donors and recipients. *South Afr J HIV Med.* (1), 11133. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/33240537/>

- Guidelines outlining considerations for the transplantation of HIV-positive donors and recipients in Southern Africa.

Lee I, Blumberg E. (2020). HIV and organ transplantation. *Curr Opin Organ Transplant.* 25(4), 371-376. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32692041/>

- Updates in organ transplant in the setting of HIV, including donors with false HIV + tests and increased cardiothoracic transplants.

Chowdary P, Shetty S, Booth J, Khurram M, Yaqoob M, Mohamed I. (2020). Experience of SARS-CoV-2 infection in two kidney transplant recipients living with HIV-1 infection. *Transpl Infect Dis.* e13500. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/33174284/>

- Case series of two patients diagnosed with COVID-19 in London who were also HIV positive kidney transplant recipients

Bonny TS, et al. (2020). Outcomes of donor-derived superinfection screening in HIV-positive to HIV-positive kidney and liver transplantation: a multicentre, prospective, observational study. *Lancet HIV,* 7(9), e611-e619. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32730756/>

- Part of the HOPE pilot study; Included 14 kidney transplant recipients and 8 liver transplant recipients from 3 hospitals in the United States who had donor-derived HIV superinfection

Waller KM, al.(2020). New blood-borne virus infections among organ transplant recipients: An Australian data-linked cohort study examining donor transmissions and other HIV, hepatitis C and hepatitis B notifications, 2000-2015. *Transpl Infect Dis.* 22(6), e13437. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/32767859/>

- Description of transmission of HIV, HBV, and HCV from organ donors in Australia finding 3/149 had viral transmission (1 HCV, 2 HBV) from donors, all of which were recognized by donation services.

Blumberg EA, Rogers CC. (2019). American Society of Transplantation Infectious Diseases Community of Practice. Solid organ transplantation in the HIV-infected patient: Guidelines from the American Society of Transplantation Infectious Diseases Community of Practice. *Clin Transplant.* 33(9), e13499. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/30773688/>

- Updated guidelines from the Infectious Diseases Community of Practice of the American Society of Transplantation review the management of transplantation in HIV-infected individuals

Charpentier C, et al. (2019). Kaposi sarcoma in HIV-positive solid-organ transplant recipients: A French multicentric national study and literature review. *Transplantation.* 103(1), e22-e28. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/30273235/>

- Retrospective multicenter study from French databases in 7 HIV positive solid organ transplanted patients reporting on the prevalence of Kaposi sarcoma.

Malinis M, et al. (2019). Screening of donor and candidate prior to solid organ transplantation—Guidelines from the American Society of Transplantation Infectious Diseases Community of Practice. *Clinical Transplantation* , 33(9), e:13548. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/30900327/>

- Updated section of the ID AST Guidelines on screening of donor and candidate prior to solid organ transplant to assess risk based on viral history, immunizations and exposures

Abara WE, et al. (2019). Characteristics of deceased solid organ donors and screening results for hepatitis B, C, and human immunodeficiency viruses — United States, 2010–2017. *MMWR Morb Mortal Wkly Rep.* 68, 61–66. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/30677008/>

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- Guideline describing criteria to categorize donors at increased risk (increased risk donors [IRDs]) for transmitting these viruses to recipients; It also recommends universal donor testing for HBV, HCV, and HIV.

Asconapé JJ. (2018). Pharmacokinetic considerations with the use of antiepileptic drugs in patients with HIV and organ transplants. *Curr Neurol Neurosci Rep.* 18(12), 89. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/30302572/>

- Review analyzing the pharmacokinetic profile of these newer antiepileptic agents to assess their potential for drug interactions with antiretrovirals and immunosuppressants.

Blair BM. (2018). Safe living following solid organ transplantation. *Infect Dis Clin North Am.* 32(3), 507-515. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/30146020/>

- The American Society for Transplantation Infectious Diseases Community of Practice guidance on strategies for living safely after SOT which includes potential exposure to others with viral or bacterial illness, potential exposure to food and water sources, participation in recreational activities, resuming sexual activity, living with pets, and opportunities for travel, especially internationally.

Bollinger JM, et al. (2019). Early experiences of independent advocates for potential HIV+ recipients of HIV+ donor organ transplants. *Clin Transplant.* 33(7), e13617. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/31140611/>

- Multi-center semi-structure interview-based study in 15 HOPE independent recipient advocates with the aim to understand the experiences of the first advocates serving in this role.

Botha J, Fabian J, Etheredge H, Conradie F, Tiemessen CT. (2019). HIV and solid organ transplantation: Where are we now. *Curr HIV/AIDS Rep.* 16(5), 404-413. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/31482298/>

- Review article on evolution of HIV and solid organ transplant over 30 years with emphasis on recent developments in HIV-infected to HIV-uninfected individuals and their implications.

Newman M, Gregg K, Estes R, Pursel K, Pitrak D. (2019). Acquired hypogammaglobulinemia and pathogen-specific antibody depletion after solid organ transplantation in human immunodeficiency virus infection: A brief report. *Transpl Infect Dis.* 21(6), e13188. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/31587457/>

- HGG in HIV+ solid organ transplant recipients may contribute to infectious complications and other clinical endpoints.

Van Pilsum Rasmussen SE, et al. (2018). Knowledge, attitudes, and planned practice of HIV-positive to HIV-positive transplantation in US transplant centers. *Clin Transplant.* 32(10), e13365. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/30074638/>

- Multicenter survey study assessing center-level barriers to implementation of the HOPE Act including knowledge, attitudes and planned protocols.

Guaraldi G, Dolci G, Zona S. et al. (2017) A frailty index predicts post-liver transplant morbidity and mortality in HIV-positive patients. *AIDS Res Ther* 14, 37. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/28779758/>

- Retrospective, observational study evaluating 47 HIV+ liver transplant recipients in Italy. This study validated the frailty index in this patient population.

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