



December 6, 2021

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Dear Sir or Madam,

As a compendium recognized by the Centers for Medicare and Medicaid Services (CMS), Medicare Part D plans utilize the information in Micromedex® DRUGDEX® for determination of medically-accepted off-label indications. This determination is critical, as it dictates whether a drug claim will be reliably paid by a Medicare Part D plan for a specific beneficiary. Current monographs for many immunosuppressive drugs in Micromedex® DRUGDEX® do not adequately address off-label organ transplant uses. As a result, transplant recipients are vulnerable to, and some have experienced, denial of coverage by Part D plans for their lifesaving immunosuppressive drug therapy.

The American Society of Transplantation became aware of this issue in 2016 and formalized a position (Appendix A). We have written to alert you of this issue once before, on April 10, 2019. We recognize and appreciate that you have since added “liver transplant rejection, prophylaxis” an appropriate off-label indication for mycophenolate sodium. Several additional updates are needed.

Per our proposed approaches for resolution, we hereby implore you to review your Micromedex® DRUGDEX® content on the following drugs, and consider expanding your “Non-FDA Uses” section to include the off-label indications listed below (these are also summarized in Appendix B):

1. Tacrolimus
 - a. Add vascular composite allograft rejection, prophylaxis
2. Cyclosporine
 - a. Add pancreas transplant rejection, prophylaxis
3. Mycophenolate mofetil
 - a. Add lung transplant rejection, prophylaxis
 - b. Add pancreas transplant rejection, prophylaxis
 - c. Add intestine transplant rejection, prophylaxis
 - d. Add vascular composite allograft rejection, prophylaxis
4. Mycophenolate sodium
 - a. Add heart transplant rejection, prophylaxis
 - b. Add lung transplant rejection, prophylaxis
 - c. Add pancreas transplant rejection, prophylaxis
 - d. Add vascular composite allograft rejection, prophylaxis

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5. Azathioprine
 - a. Add heart transplant rejection, prophylaxis
 - b. Add lung transplant rejection, prophylaxis
 - c. Add intestine transplant rejection, prophylaxis
 - d. Add vascular composite allograft rejection, prophylaxis
6. Leflunomide
 - a. Add kidney transplant rejection, prophylaxis
 - b. Add liver transplant rejection, prophylaxis
7. Prednisone/Prednisolone
 - a. Add liver transplant rejection, prophylaxis
 - b. Add lung transplant rejection, prophylaxis
 - c. Add pancreas transplant rejection, prophylaxis
 - d. Add intestine transplant rejection, prophylaxis
 - e. Add vascular composite allograft rejection, prophylaxis
8. Sirolimus
 - a. Add liver transplant rejection, prophylaxis
 - b. Add heart transplant rejection, prophylaxis
 - c. Add lung transplant rejection, prophylaxis
 - d. Add pancreas transplant rejection, prophylaxis
 - e. Add intestine transplant rejection, prophylaxis
 - f. Add vascular composite allograft rejection, prophylaxis
9. Everolimus
 - a. Add heart transplant rejection, prophylaxis
 - b. Add lung transplant rejection, prophylaxis
 - c. Add pancreas transplant rejection, prophylaxis
 - d. Add vascular composite allograft rejection, prophylaxis
10. Belatacept
 - a. Add liver transplant rejection, prophylaxis
 - b. Add heart transplant rejection, prophylaxis
 - c. Add lung transplant rejection, prophylaxis
 - d. Add pancreas transplant rejection, prophylaxis
 - e. Add vascular composite allograft rejection, prophylaxis
 - f. Add heart transplant, pre-transplant desensitization
11. Basiliximab
 - a. Add heart transplant rejection, prophylaxis
 - b. Add lung transplant rejection, prophylaxis
 - c. Add pancreas transplant rejection, prophylaxis
 - d. Add intestine transplant rejection, prophylaxis
 - e. Add vascular composite allograft rejection, prophylaxis
12. Rabbit antithymocyte globulin
 - a. Add liver transplant rejection, prophylaxis
 - b. Add intestine transplant rejection, prophylaxis
 - c. Add vascular composite allograft rejection, prophylaxis
 - d. Add liver transplant rejection, treatment
 - e. Add lung transplant rejection, treatment
 - f. Add vascular composite allograft rejection, treatment
13. Alemtuzumab
 - a. Add heart transplant rejection, prophylaxis
 - b. Add lung transplant rejection, prophylaxis
 - c. Add pancreas transplant rejection, prophylaxis
 - d. Add intestine transplant rejection, prophylaxis

- e. Add vascular composite allograft rejection, prophylaxis
 - f. Add kidney transplant rejection, treatment
 - g. Add lung transplant rejection, treatment
 - h. Add vascular composite allograft rejection, treatment
14. Immune globulin
- a. Add liver transplant rejection, treatment
 - b. Add heart transplant rejection, treatment
 - c. Add lung transplant rejection, treatment
 - d. Add pancreas transplant rejection, treatment
 - e. Add intestine transplant rejection, treatment
 - f. Add vascular composite allograft rejection, treatment
 - g. Add liver transplant, pre-transplant desensitization
 - h. Add heart transplant, pre-transplant desensitization
 - i. Add intestine transplant, pre-transplant desensitization
15. Rituximab
- a. Add intestine transplant rejection, prophylaxis
 - b. Add kidney transplant rejection, treatment
 - c. Add liver transplant rejection, treatment
 - d. Add heart transplant rejection, treatment
 - e. Add lung transplant rejection, treatment
 - f. Add pancreas transplant rejection, treatment
 - g. Add intestine transplant rejection, treatment
 - h. Add vascular composite allograft rejection, treatment
 - i. Add kidney transplant, pre-transplant desensitization
 - j. Add liver transplant, pre-transplant desensitization
 - k. Add heart transplant, pre-transplant desensitization
16. Bortezomib
- a. Add kidney transplant rejection, treatment
 - b. Add liver transplant rejection, treatment
 - c. Add heart transplant rejection, treatment
 - d. Add lung transplant rejection, treatment
 - e. Add pancreas transplant rejection, treatment
 - f. Add intestine transplant rejection, treatment
 - g. Add vascular composite allograft rejection, treatment
 - h. Add kidney transplant, pre-transplant desensitization
 - i. Add heart transplant, pre-transplant desensitization
17. Carfilzomib
- a. Add lung transplant rejection, treatment
 - b. Add kidney transplant, pre-transplant desensitization
 - c. Add heart transplant, pre-transplant desensitization
18. Eculizumab
- a. Add heart transplant rejection, prophylaxis
 - b. Add kidney transplant rejection, treatment
 - c. Add liver transplant rejection, treatment
 - d. Add heart transplant rejection, treatment
 - e. Add lung transplant rejection, treatment
 - f. Add pancreas transplant rejection, treatment
 - g. Add intestine transplant rejection, treatment
 - h. Add vascular composite allograft rejection, treatment
 - i. Add kidney transplant, pre-transplant desensitization

19. Tocilizumab
 - a. Add kidney transplant rejection, treatment
 - b. Add kidney transplant, pre-transplant desensitization
20. Adalimumab
 - a. Add intestine transplant rejection, treatment
21. Infliximab
 - a. Add intestine transplant rejection, treatment

We realize that you require at least one citation from the medical literature to support each of these revisions. We have reviewed the literature, and Appendix B contains the citations that we believe meet this need.

Thank you in advance for your attention to this matter.

Sincerely,

A handwritten signature in black ink, appearing to read "John Gill", written in a cursive style.

John Gill, MD, MS
President

Attachments:

- Appendix A: AST Position Statement on Immunosuppressant Drug Coverage Under Medicare Part D Benefit
- Appendix B: Overview of drug/indication pairs with on- or off-label indications already endorsed by Micromedex (green) and those for which we request endorsement (yellow)
- Appendix C: Citations from the medical literature in support of the proposed off-label indication

Appendix A:

AST Position Statement on Immunosuppressant Drug Coverage Under Medicare Part D Benefit

<https://www.myast.org/public-policy/key-position-statements/immunosuppressant-drug-coverage-under-medicare-part-d-benefit>

Appendix B:

Overview of drug/indication pairs with on- or off-label indications already endorsed by Micromedex (green) and those for which we request endorsement (yellow)

	Tacrolimus	Cyclosporine	Mycophenolate mofetil	Mycophenolate sodium	Azathioprine	Leflunomide	Prednisone/Prednisolone	Sirolimus	Everolimus	Belatacept	Basiliximab	Rabbit antithymocyte globulin	Alemtuzumab	Immune globulin	Rituximab	Bortezomib	Carfilzomib	Eculizumab	Tocilizumab	Adalimumab	Infliximab
To prevent rejection																					
Kidney						B															
Liver						C	A	A		C		B									
Heart				A	A			A	A	C	C		C						C		
Lung			A	A	A		A	A	A	C	B		B								
Pancreas		A	A	B			A	A	B	C	C		B								
Intestine			C		C		C	C			C	C	C		C						
Vascular Composite Allograft	C		C	C	C		C	C	C	C	C	C	C								
To treat rejection																					
Kidney													C			B	B		B	C	
Liver												C		C	C	C			C		
Heart														C	C	C			C		
Lung												C	C	B	C	C	C		C		
Pancreas														C	C	C			C		
Intestine														C	C	C			C		C
Vascular Composite Allograft												C	C	C	C	C			C		
For pre-transplant desensitization																					
Kidney																B	B	C	B	C	
Liver														C	C						
Heart										C				B	C	B	C				
Lung																					
Pancreas																					
Intestine														C							

Adapted from Lexi-Drugs © Level of Evidence Scale

- A. Evidence from well performed randomized, controlled trials or overwhelming evidence of some other form to support the off-label use
- B. Evidence from randomized, controlled trials with important limitations (e.g., inconsistent results, methodologic flaws, indirect, imprecise) or very strong evidence of some other research design
- C. Evidence from observational studies (e.g., retrospective case series/reports providing significant impact on patient care); unsystematic clinical experience; or potentially flawed randomized, controlled trials (e.g., when limited options exist for condition)

Appendix C:

Citations from the medical literature in support of the proposed off-label indication

1. Tacrolimus

a. Add vascular composite allograft rejection, prophylaxis

- i. Johannesson L, Testa G, Putman JM, et al. Twelve live births after uterus transplantation in the Dallas UtErus transplant study. *Obstet Gynecol* 2021;137(2):241-249.
- ii. Tasigiorgos S, Kollar B, Turk M, et al. Five year follow-up after face transplantation. *N Engl J Med* 2019; 380:2579-2581.
- iii. Diaz-Siso JR, Fischer S, Sisk GC, et al. Initial experience of dual maintenance immunosuppression with steroid withdrawal in vascular composite tissue allotransplantation. *Am J Transplant* 2015;15(5):1421-31.
- iv. Brännström M, Johannesson L, Bokström H, et al. Livebirth after uterus transplantation. *Lancet* 2015;385(9968):607-616.
- v. Petruzzo P, Kanitakis J, Testelin S, et al. Clinicopathological findings of chronic rejection in a face grafted patient. *Transplantation* 2015; 99(12): 2644-50.
- vi. Kaufman CL, Ouseph R, Blair B, et al. Graft vasculopathy in clinical hand transplantation. *Am J Transplant* 2012;12(4):1004-16.
- vii. Petruzzo P, Kanitakis J, Badet L, et al. Long-term follow-up in composite tissue allotransplantation: in-depth study of five (hand and face) recipients. *Am J Transplant* 2011; 11: 808-16.
- viii. Lantieri L, Hivelin M, Audard V, et al. Feasibility, reproducibility, risks and benefits of face transplantation: A prospective study of outcomes. *Am J Transplant* 2011; 11: 367-78
- ix. Devauchelle B, Badet L, Lengele B, et al. First human face allograft: early report. *Lancet* 2006; 368: 203-09.
- x. Jones JW, Gruber SA, Barker JH, et al. Successful hand transplantation: one year follow-up. *N Engl J Med* 2000;343:468-73.
- xi. Dubernard JM, Owen E, Herzberg G, et al. Human hand allograft: report on first 6 months. *Lancet* 1999; 353: 1315-20.

2. Cyclosporine

a. Add pancreas transplant rejection, prophylaxis

- i. Knight RJ, Podder H, Kerman RH, et al. Comparing an early corticosteroid/late calcineurin-free immunosuppression protocol to a sirolimus-, cyclosporine A-, and prednisone-based regimen for pancreas-kidney transplantation. *Transplantation* 2010; 89(6): 727-32.
- ii. Rajab A, Pelletier RP, Ferguson RM, et al. Steroid-free maintenance immunosuppression with rapamune and low-dose neoral in pancreas transplant recipients. *Transplantation* 2007; 84(9): 1131-7.
- iii. Boggi U, Vistoli F, Del Chiaro M, et al. Neoral versus prograf in simultaneous pancreas-kidney transplantation with portal venous drainage: three-year results of a single-center, open-label,

prospective, randomized pilot study. *Transplant Proc* 2005; 37(6): 2641-3.

- iv. Boggi U, Vistoli F, Del Chiaro M, et al. Single-center, open, prospective, randomized pilot study comparing cyclosporine versus tacrolimus in simultaneous pancreas-kidney transplantation. *Transplant Proc* 2004; 36(4): 1064-6.

3. Mycophenolate mofetil

- a. Add lung transplant rejection, prophylaxis
 - i. McNeil K, Glanville AR, Wahlers T, et al. Comparison of mycophenolate mofetil and azathioprine for prevention of bronchiolitis obliterans syndrome in de novo lung transplant recipients. *Transplantation* 2006; 81: 998-1003.
 - ii. Zuckermann A, Reichenspurner H, Birsan T, et al. Cyclosporine A versus tacrolimus in combination with mycophenolate mofetil and steroids as primary immunosuppression after lung transplantation: one-year results of a 2-center prospective randomized trial. *J Thorac Cardiovasc Surg* 2003; 125: 891-900.
 - iii. Palmer SM, Baz MA, Sanders L, et al. Results of a randomized, prospective, multicenter trial of mycophenolate mofetil versus azathioprine in the prevention of acute lung allograft rejection. *Transplantation* 2001; 71: 1772-6.
- b. Add pancreas transplant rejection, prophylaxis
 - i. Cantarovich D, Karam G, Hourmant M et al. Steroid avoidance versus steroid withdrawal after simultaneous pancreas-kidney transplantation. *Am J Transplant* 2005; 5(6): 1332-8.
 - ii. Merion RM, Henry ML, Melzer JS, et al. Randomized, prospective trial of mycophenolate mofetil versus azathioprine for prevention of acute renal allograft rejection after simultaneous kidney-pancreas transplantation. *Transplantation* 2000; 70(1):105-11.
 - iii. Stegall MD, Simon M, Wachs ME, et al. Mycophenolate mofetil decreases rejection in simultaneous pancreas-kidney transplantation when combined with tacrolimus or cyclosporine. *Transplantation* 1997; 64(12): 1695-700.
- c. Add intestine transplant rejection, prophylaxis
 - i. Abu-Elmagd KM, Costa G, Bond GJ, et al. Five hundred intestinal and multivisceral transplantations at a single center: major advances with new challenges. *Ann Surg* 2009; 250(4): 567-81.
- d. Add vascular composite allograft rejection, prophylaxis
 - i. Tasigiorgos S, Kollar B, Turk M, et al. Five year follow-up after face transplantation. *N Engl J Med* 2019; 380:2579-2581.
 - ii. Diaz-Siso JR, Fischer S, Sisk GC, et al. Initial experience of dual maintenance immunosuppression with steroid withdrawal in vascular composite tissue allotransplantation. *Am J Transplant* 2015;15(5):1421-31.

- iii. Petruzzo P, Kanitakis J, Testelin S, et al. Clinicopathological findings of chronic rejection in a face grafted patient. *Transplantation* 2015; 99(12): 2644-50.
- iv. Kaufman CL, Ouseph R, Blair B, et al. Graft vasculopathy in clinical hand transplantation. *Am J Transplant* 2012;12(4):1004-16.
- v. Petruzzo P, Kanitakis J, Badet L, et al. Long-term follow-up in composite tissue allotransplantation: in-depth study of five (hand and face) recipients. *Am J Transplant* 2011; 11: 808-16.
- vi. Lantieri L, Hivelin M, Audard V, et al. Feasibility, reproducibility, risks and benefits of face transplantation: A prospective study of outcomes. *Am J Transplant* 2011; 11: 367-78
- vii. Devauchelle B, Badet L, Lengele B, et al. First human face allograft: early report. *Lancet* 2006; 368: 203-09.
- viii. Jones JW, Gruber SA, Barker JH, et al. Successful hand transplantation: one year follow-up. *N Engl J Med* 2000;343:468-73.
- ix. Dubernard JM, Owen E, Herzberg G, et al. Human hand allograft: report on first 6 months. *Lancet* 1999; 353: 1315-20.

4. Mycophenolate sodium

- a. Add heart transplant rejection, prophylaxis
 - i. Lehmkuhl H, Hummel M, Kobashigawa J, et al. Enteric-coated mycophenolate-sodium in heart transplantation: efficacy, safety, and pharmacokinetic compared with mycophenolate mofetil. *Transplant Proc* 2008; 40(4): 953-5.
 - ii. Kobashigawa JA, Renlund DG, Gerosa G, et al. Similar efficacy and safety of enteric-coated mycophenolate sodium (EC-MPS, myfortic) compared with mycophenolate mofetil (MMF) in de novo heart transplant recipients: results of a 12-month, single-blind, randomized, parallel-group, multicenter study. *J Heart Lung Transplant* 2006; 25(8): 935-41.
- b. Add lung transplant rejection, prophylaxis
 - i. Glanville AR, Aboyoum C, Klepetko W, et al. Three-year results of an investigator-driven multicenter, international, randomized open-label de novo trial to prevent BOS after lung transplantation. *J Heart Lung Transplant* 2015; 34: 16-25.
- c. Add pancreas transplant rejection, prophylaxis
 - i. Belliere J, Esposito L, Gandia P, et al. Comparison of the exposure of mycophenolate mofetil and enteric-coated mycophenolate sodium in recipients of kidney-pancreas transplantation. *Ann Transplant* 2014; 19: 76-81.
 - ii. Ricart MJ, Oppenheimer F, Andrés A, et al. Enteric-coated mycophenolate sodium in de novo and maintenance kidney-pancreas transplant recipients. *Clin Transplant* 2012;26(3):424-31.
 - iii. Rangel EB, Melaragno CS, Sá JR, et al. Mycophenolate mofetil versus enteric-coated mycophenolate sodium after simultaneous pancreas-kidney transplantation. *Transplant Proc* 2009

Dec;41(10):4265-9.

- d. Add vascular composite allograft rejection, prophylaxis
 - i. Tasigiorgos S, Kollar B, Turk M, et al. Five year follow-up after face transplantation. *N Engl J Med* 2019; 380:2579-2581.
 - ii. Diaz-Siso JR, Fischer S, Sisk GC, et al. Initial experience of dual maintenance immunosuppression with steroid withdrawal in vascular composite tissue allotransplantation. *Am J Transplant* 2015;15(5):1421-31.

5. Azathioprine

- a. Add heart transplant rejection, prophylaxis
 - i. Keogh A, Macdonald P, Mundy J, et al. Five-year follow-up of a randomized double-drug versus triple-drug therapy immunosuppressive trial after heart transplantation. *J Heart Lung Transplant* 1992; 11(3 Pt 1): 550-5.
 - ii. Esmore DS, Spratt PM, Keogh AM, et al. Cyclosporine and azathioprine immunosuppression without maintenance steroids: a prospective randomized trial. *J Heart Transplant* 1989; 8(3): 194-9.
 - iii. Barnhart GR, Goldman MH, Hastillo A, et al. Comparison of immunosuppression therapy following heart transplantation: pretransfusion/azathioprine/ATG/prednisone versus cyclosporine/prednisone. *J Heart Transplant* 1985; 4: 381-4.
- b. Add lung transplant rejection, prophylaxis
 - i. Bhorade S, Ahya VN, Baz MA, et al. Comparison of sirolimus with azathioprine in a tacrolimus-based immunosuppressive regimen in lung transplantation. *Am J Respir Crit Care Med* 2011; 183: 379-87.
 - ii. McNeil K, Glanville AR, Wahlers T, et al. Comparison of mycophenolate mofetil and azathioprine for prevention of bronchiolitis obliterans syndrome in de novo lung transplant recipients. *Transplantation* 2006; 81: 998-1003.
 - iii. Palmer SM, Baz MA, Sanders L, et al. Results of a randomized, prospective, multicenter trial of mycophenolate mofetil versus azathioprine in the prevention of acute lung allograft rejection. *Transplantation* 2001; 71: 1772-6.
- c. Add intestine transplant rejection, prophylaxis
 - i. Abu-Elmagd KM, Costa G, Bond GJ, et al. Five hundred intestinal and multivisceral transplantations at a single center: major advances with new challenges. *Ann Surg* 2009; 250(4): 567-81.
- d. Add vascular composite allograft rejection, prophylaxis
 - i. Johannesson L, Testa G, Putman JM, et al. Twelve live births after uterus transplantation in the Dallas UtErus transplant study. *Obstet Gynecol* 2021;137(2):241-249.

- ii. Brännström M, Johannesson L, Bokström H, et al. Livebirth after uterus transplantation. *Lancet* 2015;385(9968):607-616.

6. Leflunomide

- a. Add kidney transplant rejection, prophylaxis
 - i. Williams JW, Mital D, Chong A, et al. Experiences with leflunomide in solid organ transplantation. *Transplantation* 2002; 73(3): 358-66.
 - ii. Hardinger KL, Wang CD, Schnitzler MA, et al. Prospective, pilot, open-label, short-term study of conversion to leflunomide reverses chronic renal allograft dysfunction. *Am J Transplant* 2002; 2(9): 867-71.
 - iii. Pascual J, Orte J, Marcén R, et al. Use of leflunomide in human renal transplantation. *Transplantation* 2001; 72(10): 1709.
- b. Add liver transplant rejection, prophylaxis
 - i. Williams JW, Mital D, Chong A, et al. Experiences with leflunomide in solid organ transplantation. *Transplantation* 2002; 73(3): 358-66.

7. Prednisone/Prednisolone

- a. Add liver transplant rejection, prophylaxis
 - i. Klintmalm G, Davis G, Teperman, L, et al. A Randomized, Multicenter Study Comparing Steroid-Free Immunosuppression and Standard Immunosuppression for Liver Transplant Recipients with Chronic Hepatitis C. *Liver Transplantation* 2011; 17:1394-1403.
 - ii. Segev DL, Sozio SM, Shin EJ, et al. Steroid avoidance in liver transplantation: meta-analysis and meta-regression of randomized trials. *Liver Transpl* 2008;14(4):512-25.
 - iii. Pageaux GP, Calmus Y, Boillot O, et al. Steroid withdrawal at day 14 after liver transplantation: a double-blind, placebo-controlled study. *Liver Transpl* 2004;10(12):1454-60.
 - iv. Wiesner R, Rabkin J, Klintmalm G, et al. A Randomized Double-Blind Comparative Study of Mycophenolate Mofetil and Azathioprine in Combination with Cyclosporine and Corticosteroids in Primary Liver Transplant Recipients. *Liver Transplantation* 2001; 7(5):442-450.
- b. Add lung transplant rejection, prophylaxis
 - i. McNeil K, Glanville AR, Wahlers T, et al. Comparison of mycophenolate mofetil and azathioprine for prevention of bronchiolitis obliterans syndrome in de novo lung transplant recipients. *Transplantation* 2006; 81: 998-1003.
 - ii. Borro JM, Solé A, De la Torre M, Pastor A, Tarazona V. Steroid withdrawal in lung transplant recipients. *Transplant Proc* 2005; 37(9): 3991-3.
 - iii. Zuckermann A, Reichenspurner H, Birsan T, et al. Cyclosporine A versus tacrolimus in combination with mycophenolate mofetil and

- steroids as primary immunosuppression after lung transplantation: one-year results of a 2-center prospective randomized trial. *J Thorac Cardiovasc Surg* 2003; 125: 891-900.
- iv. Palmer SM, Baz MA, Sanders L, et al. Results of a randomized, prospective, multicenter trial of mycophenolate mofetil versus azathioprine in the prevention of acute lung allograft rejection. *Transplantation* 2001; 71: 1772-6.
- c. Add pancreas transplant rejection, prophylaxis
 - i. Knight RJ, Podder H, Kerman RH, et al. Comparing an early corticosteroid/late calcineurin-free immunosuppression protocol to a sirolimus-, cyclosporine A-, and prednisone-based regimen for pancreas-kidney transplantation. *Transplantation* 2010; 89(6): 727-32.
 - ii. Boggi U, Vistoli F, Del Chiaro M, et al. Neoral versus prograf in simultaneous pancreas-kidney transplantation with portal venous drainage: three-year results of a single-center, open-label, prospective, randomized pilot study. *Transplant Proc* 2005; 37(6): 2641-3.
 - iii. Boggi U, Vistoli F, Del Chiaro M, et al. Single-center, open, prospective, randomized pilot study comparing cyclosporine versus tacrolimus in simultaneous pancreas-kidney transplantation. *Transplant Proc* 2004; 36(4): 1064-6.
 - d. Add intestine transplant rejection, prophylaxis
 - i. Ekser B, Kubal CA, Fridell JA, Mangus RS. Comparable outcomes in intestinal retransplantation: Single-center cohort study. *Clin Transplant* 2018; 32(7):e13290.
 - ii. Chang HK, Kim SY, Kim JI, et al. Ten-year experience with bowel transplantation at Seoul St. Mary's Hospital. *Transplant Proc* 2016; 48(2):473-8.
 - iii. Abu-Elmagd KM, Costa G, Bond GJ, et al. Five hundred intestinal and multivisceral transplantations at a single center: major advances with new challenges. *Ann Surg* 2009; 250(4): 567-81.
 - e. Add vascular composite allograft rejection, prophylaxis
 - i. Johannesson L, Testa G, Putman JM, et al. Twelve live births after uterus transplantation in the Dallas UtErus transplant study. *Obstet Gynecol* 2021;137(2):241-249.
 - ii. Tasigiorgos S, Kollar B, Turk M, et al. Five year follow-up after face transplantation. *N Engl J Med* 2019; 380:2579-2581.
 - iii. Brännström M, Johannesson L, Bokström H, et al. Livebirth after uterus transplantation. *Lancet* 2015;385(9968):607-616.
 - iv. Petruzzo P, Kanitakis J, Testelin S, et al. Clinicopathological findings of chronic rejection in a face grafted patient. *Transplantation* 2015; 99(12): 2644-50.
 - v. Kaufman CL, Ouseph R, Blair B, et al. Graft vasculopathy in clinical hand transplantation. *Am J Transplant* 2012;12(4):1004-16.

- vi. Petruzzo P, Kanitakis J, Badet L, et al. Long-term follow-up in composite tissue allotransplantation: in-depth study of five (hand and face) recipients. *Am J Transplant* 2011; 11: 808-16.
- vii. Lantieri L, Hivelin M, Audard V, et al. Feasibility, reproducibility, risks and benefits of face transplantation: A prospective study of outcomes. *Am J Transplant* 2011; 11: 367-78.
- viii. Devauchelle B, Badet L, Lengele B, et al. First human face allograft: early report. *Lancet* 2006; 368: 203-09.
- ix. Jones JW, Gruber SA, Barker JH, et al. Successful hand transplantation: one year follow-up. *N Engl J Med* 2000;343:468-73.
- x. Dubernard JM, Owen E, Herzberg G, et al. Human hand allograft: report on first 6 months. *Lancet* 1999; 353: 1315-20.

8. Sirolimus

- a. Add liver transplant rejection, prophylaxis
 - i. Geissler EK, Schnitzbauer AA, Zulke C. Sirolimus use in liver transplant recipients with hepatocellular carcinoma: a randomized, multicenter, open-label phase 3 trial. *Transplantation* 2016; 100(1): 116-25.
 - ii. Schnitzbauer AA, Sothmann J, Baier L, et al. Calcineurin inhibitor free de novo immunosuppression in liver transplant recipients with pretransplant renal impairment: results of a pilot study (PATRON07). *Transplantation* 2015; 99(12): 2565-75.
 - iii. Teperman L, Moonka D, Sebastian A, et al. Calcineurin inhibitor-free mycophenolate mofetil/sirolimus maintenance in liver transplantation: the randomized spare-the-nephron trial. *Liver Transpl* 2013; 19(7): 675-89.
 - iv. Watson CJ, Gimson AE, Alexander GJ, et al. A randomized controlled trial of late conversion from calcineurin inhibitor (CNI)-based to sirolimus-based immunosuppression in liver transplant recipients with impaired renal function. *Liver Transpl* 2007; 13(12): 1694-702.
 - v. Chang GJ, Mahanty HD, Quan D, et al. Experience with the use of sirolimus in liver transplantation – use in patients for whom calcineurin inhibitors are contraindicated. *Liver Transpl* 2000; 6(6): 734-40.
- b. Add heart transplant rejection, prophylaxis
 - i. Guethoff S, Stroeh K, Grinninger C, et al. De novo sirolimus with low-dose tacrolimus versus full-dose tacrolimus with mycophenolate mofetil after heart transplantation--8-year results. *J Heart Lung Transplant* 2015; 34(5): 634-42.
 - ii. Kaczmarek I, Zaruba MM, Beiras-Fernandez A, et al. Tacrolimus with mycophenolate mofetil or sirolimus compared with calcineurin inhibitor-free immunosuppression (sirolimus/mycophenolate mofetil) after heart transplantation: 5-year results. *J Heart Lung Transplant* 2013; 32(3): 277-84.

- iii. Zuckermann A, Keogh A, Crespo-Leiro MG, et al. Randomized controlled trial of sirolimus conversion in cardiac transplant recipients with renal insufficiency. *Am J Transplant* 2012; 12(9): 2487-97.
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- c. Add lung transplant rejection, prophylaxis
- i. Sacher VY, Fertel D, Srivastana, et al. Effects of prophylactic use of sirolimus on bronchiolitis obliterans syndrome development in lung transplant recipients. *Ann Thorac Surg* 2014;97(1):268-74.
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- d. Add pancreas transplant rejection, prophylaxis
- i. Ciancio G, Sageshima J, Chen L, et al. Advantage of rapamycin over mycophenolate mofetil when used with tacrolimus for simultaneous pancreas kidney transplants: randomized, single-center trial at 10 years. *Am J Transplant* 2012; 12(12): 3363-76.
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- e. Add intestine transplant rejection, prophylaxis
 - i. Abu-Elmagd KM, Costa G, Bond GJ, et al. Five hundred intestinal and multivisceral transplantations at a single center: major advances with new challenges. *Ann Surg* 2009; 250(4): 567-81.
 - ii. Lauro A, Dazzi A, Ercolani G, et al. Rejection episodes and 3-year graft survival under sirolimus and tacrolimus treatment after adult intestinal transplantation. *Transplant Proc* 2007; 39(5): 1629-31.
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 - f. Add vascular composite allograft rejection, prophylaxis
 - i. Kaufman CL, Ouseph R, Blair B, et al. Graft vasculopathy in clinical hand transplantation. *Am J Transplant* 2012;12(4):1004-16.
 - ii. Petruzzo P, Kanitakis J, Badet L, et al. Long-term follow-up in composite tissue allotransplantation: in-depth study of five (hand and face) recipients. *Am J Transplant* 2011; 11: 808-16.
 - iii. Brandacher G, Ninkovic M, Piza-Katzer H, et al. The Innsbruck hand transplant program: update at 8 years after the first transplant. *Transplant Proc* 2009;41(2):491-4.

9. Everolimus

- a. Add heart transplant rejection, prophylaxis
 - i. Potena L, Pellegrinin C, Grigioni F, et al. Optimizing the safety profile of everolimus by delayed initiation in de novo heart transplant recipients: results of the prospective randomized study EVERHEART. *Transplantation* 2018; 102(3): 493-501.
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 - iv. Arora S, Andreassen AK, Andersson B, et al. The effect of everolimus initiation and calcineurin inhibitor elimination on cardiac allograft vasculopathy in de novo recipients: one-year results of a Scandinavian randomized trial. *Am J Transplant* 2015; 15(7): 1967-75.

- v. Andreassen AK, Andersson B, Gustafsson F, et al. Everolimus initiation and early calcineurin inhibitor withdrawal in heart transplant recipients: a randomized trial. *Am J Transplant* 2014; 14(8): 1828-38.
 - vi. Eisen HJ, Kobashigawa J, Starling RC, et al. Everolimus versus mycophenolate mofetil in heart transplantation: a randomized, multicenter trial. *Am J Transplant* 2013; 13(5): 1203-16.
 - vii. Arora S, Ueland T, Wennerblom B, et al. Effect of everolimus introduction on cardiac allograft vasculopathy—results of a randomized, multicenter trial. *Transplantation* 2011; 92(2): 235-43.
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- b. Add lung transplant rejection, prophylaxis
- i. Gullestad L, Eiskjaer H, Gustafsson F, et al. Long-term outcomes of thoracic transplant recipients following conversion to everolimus with reduced calcineurin inhibitor in a multicenter, open-label, randomized trial. *Transpl Int* 2016; 29: 819-29.
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- c. Add pancreas transplant rejection, prophylaxis
- i. Li J, Koch M, Kramer K, et al. Dual antibody induction and de novo use of everolimus enable low-dose tacrolimus with early

- corticosteroid withdrawal in simultaneous pancreas-kidney transplantation. *Transpl Immunol* 2018; 50: 226-33.
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 - d. Add vascular composite allograft rejection, prophylaxis
 - i. Johannesson L, Testa G, Putman JM, et al. Twelve live births after uterus transplantation in the Dallas UtErus transplant study. *Obstet Gynecol* 2021;137(2):241-249.
 - ii. Brandacher G, Ninkovic M, Piza-Katzer H, et al. The Innsbruck hand transplant program: update at 8 years after the first transplant. *Transplant Proc* 2009;41(2):491-4.

10. Belatacept

- a. Add liver transplant rejection, prophylaxis
 - i. LaMattina JC, Jason MP, Hanish SI, et al. Safety of belatacept bridging immunosuppression in hepatitis C-positive liver transplant recipients with renal dysfunction. *Transplantation* 2014; 97(2): 133-7.
- b. Add heart transplant rejection, prophylaxis
 - i. Launay M, Guitard J, Dorent R, et al. Belatacept-based immunosuppression: A calcineurin inhibitor-sparing regimen in heart transplant recipients. *Am J Transplant* 2020;20(2):553-563.
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- c. Add lung transplant rejection, prophylaxis
 - i. Iasella CJ, Winstead RJ, Moore CA, et al. Maintenance belatacept-based immunosuppression in lung transplantation recipients who failed calcineurin inhibitors. *Transplantation* 2018; 102(1): 171-7.
 - ii. Timofte I, Terrin M, Barr E, et al. Belatacept for renal rescue in lung transplant patients. *Transpl Int* 2016; 29(4): 453-63.
- d. Add pancreas transplant rejection, prophylaxis
 - i. Mujtaba MA, Sharfuddin AA, Taber T, et al. Conversion from tacrolimus to belatacept to prevent the progression of chronic kidney disease in pancreas transplantation: case report of two patients. *Am J Transplant* 2014; 14(11): 2657-61.
- e. Add vascular composite allograft rejection, prophylaxis
 - i. Cendales LC, Ruch DS, Cardones AR, et al. De novo belatacept in clinical vascularized composite allotransplantation. *Am J Transplant* 2018;18(7):1804-1809.

- ii. Grahammer J, Weissenbacher A, Zelger BG, et al. Benefits and limitations of belatacept in 4 hand-transplanted patients. *Am J Transplant* 2017;17(12):3228-3235.
 - iii. Cendales L, Bray R, Gebel H, et al. Tacrolimus to belatacept conversion following hand transplantation: a case report. *Am J Transplant* 2015 Aug;15(8):2250-5.
- f. Add heart transplant, pre-transplant desensitization
- i. Alishetti S, Farr M, Jennings D, et al. Desensitizing highly sensitized heart transplant candidates with the combination of belatacept and proteasome inhibition. *Am J Transplant* 2020; 20(12): 3620-3630.

11. Basiliximab

- a. Add heart transplant rejection, prophylaxis
- i. Cantarovich M, Giannetti N, Routy JP, et al. Long-term immunosuppression with anti-CD25 monoclonal antibodies in heart transplant patients with chronic kidney disease. *J Heart Lung Transplant* 2009; 28(9): 912-8.
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- b. Add lung transplant rejection, prophylaxis
- i. Borro JM, De la Torre M, Miguelez C, et al. Comparative study of basiliximab treatment in lung transplantation. *Transplant Proc* 2005; 37(9): 3996-8.
- c. Add pancreas transplant rejection, prophylaxis
- i. Fernández-Burgos I, Montiel Casado MC, Pérez-Daga JA, et al. Induction therapy in simultaneous pancreas-kidney transplantation: thymoglobulin versus basiliximab. *Transplant Proc* 2015; 47(1): 120-2.
- d. Add intestine transplant rejection, prophylaxis
- i. Kubal CA, Mangus RS, Vianna RM, et al. Impact of positive flow cytometry crossmatch on outcomes of intestinal/multivisceral transplantation: role anti-IL-2 receptor antibody. *Transplantation* 2013; 95(9): 1160-6.
- e. Add vascular composite allograft rejection, prophylaxis
- i. Kaufman CL, Ouseph R, Blair B, et al. Graft vasculopathy in clinical hand transplantation. *Am J Transplant* 2012;12(4):1004-16.
 - ii. Jones JW, Gruber SA, Barker JH, et al. Successful hand transplantation: one year follow-up. *N Engl J Med* 2000;343:468-73.

12. Rabbit antithymocyte globulin

- a. Add liver transplant rejection, prophylaxis
 - i. Montenovo MI, Jalikis FG, Li M, et al. Superior patient and graft survival in adult liver transplant with rabbit antithymocyte globulin induction: experience with 595 patients. *Exp Clin Transplant* 2017; 15(4): 425-31.
 - ii. Bogetti D, Sankary HN, Jarzembowski TM, et al. Thymoglobulin induction protects liver allografts from ischemia/reperfusion injury. *Clin Transplant* 2005; 19(4): 507-11.

- b. Add intestine transplant rejection, prophylaxis
 - i. Abu-Elmagd KM, Costa G, Bond GJ, et al. Five hundred intestinal and multivisceral transplantations at a single center: major advances with new challenges. *Ann Surg* 2009; 250(4): 567-81.
 - ii. Vianna RM, Mangus RS, Fridell JA, et al. Induction immunosuppression with thymoglobulin and rituximab in intestinal and multivisceral transplantation. *Transplantation* 2008; 85(9): 1290-3.
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- c. Add vascular composite allograft rejection, prophylaxis
 - i. Johannesson L, Testa G, Putman JM, et al. Twelve live births after uterus transplantation in the Dallas UtErus transplant study. *Obstet Gynecol* 2021;137(2):241-249.
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 - iv. Petruzzo P, Kanitakis J, Badet L, et al. Long-term follow-up in composite tissue allotransplantation: in-depth study of five (hand and face) recipients. *Am J Transplant* 2011; 11: 808-16.
 - v. Lantieri L, Hivelin M, Audard V, et al. Feasibility, reproducibility, risks and benefits of face transplantation: A prospective study of outcomes. *Am J Transplant* 2011; 11: 367-78.
 - vi. Brandacher G, Ninkovic M, Piza-Katzer H, et al. The Innsbruck hand transplant program: update at 8 years after the first transplant. *Transplant Proc* 2009;41(2):491-4.
 - vii. Devauchelle B, Badet L, Lengele B, et al. First human face allograft: early report. *Lancet* 2006; 368: 203-09.
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- d. Add liver transplant rejection, treatment
 - i. Palmer WC, Taner CB, Keaveny AP, et al. Antithymocyte globulin use for corticosteroid nonresponsive rejection after liver transplantation. *Transplant Proc* 2018; 50(10): 3606-14.
 - ii. Kozlowski T, Rubinas T, Nিকেleit V, et al. Liver allograft antibody-mediated rejection with demonstration of sinusoidal C4d staining and circulating donor-specific antibodies. *Liver Transpl* 2011; 17(4): 357-68.
 - iii. Wilson CH, Agarwal K, Carter V, et al. Late humoral rejection in a compliant ABO-compatible liver transplant recipient. *Transplantation* 2006; 82(7): 988-9.
- e. Add lung transplant rejection, treatment
 - i. January SE, Fester KA, Bain KB, et al. Rabbit antithymocyte globulin for the treatment of chronic lung allograft dysfunction. *Clin Transplant* 2019; 33(10): e13708.
 - ii. Izhakian S, Wasser WG, Fox BD, et al. Effectiveness of Rabbit Antithymocyte Globulin in Chronic Lung Allograft Dysfunction. *Transplant Proc* 2016; 48(6): 2152-6.
- f. Add vascular composite allograft rejection, treatment
 - i. Tasigiorgos S, Kollar B, Turk M, et al. Five year follow-up after face transplantation. *N Engl J Med* 2019; 380:2579-2581.

13. Alemtuzumab

- a. Add heart transplant rejection, prophylaxis
 - i. Gale SE, Ravichandran B, Ton VK, et al. Alemtuzumab Induction Versus Conventional Immunosuppression in Heart Transplant Recipients. *J Cardiovasc Pharmacol Ther* 2019;24(5):435-441.
 - ii. Teuteberg JJ, Shullo MA, Zomak R, et al. Alemtuzumab induction prior to cardiac transplantation with lower intensity maintenance immunosuppression: one-year outcomes. *Am J Transplant* 2010;10(2):382-8.
- b. Add lung transplant rejection, prophylaxis
 - i. Benazzo A, Schwarz S, Muckenhuber M, et al. Alemtuzumab induction combined with reduced maintenance immunosuppression is associated with improved outcomes after lung transplantation: A single centre experience. *PLoS One* 2019; 14(1): e0210443.
 - ii. Jaksch P, Ankersmit J, Scheed A, et al. Alemtuzumab in lung transplantation: an open-label, randomized, prospective single center study. *Am J Transplant* 2014; 14(8): 1839-45.
- c. Add pancreas transplant rejection, prophylaxis
 - i. Stratta RJ, Rogers J, Orlando G, et al. Depleting antibody induction in simultaneous pancreas-kidney transplantation: a prospective single-center comparison of alemtuzumab versus rabbit anti-thymocyte globulin. *Expert Opin Biol Ther* 2014; 14(12): 1723-30.

- ii. Farney AC, Doares W, Rogers J, et al. A randomized trial of alemtuzumab versus antithymocyte globulin induction in renal and pancreas transplantation. *Transplantation* 2009; 88(6): 810-9.
- d. Add intestine transplant rejection, prophylaxis
 - i. Lauro A, Zanfi C, Bagni A, et al. Induction therapy in adult intestinal transplantation: reduced incidence of rejection with “2-dose” alemtuzumab protocol. *Clin Transplant* 2013; 27(4): 567-70.
 - ii. Zanfi C, Lauro C, Cescon M, et al. Daclizumab and alemtuzumab as induction agents in adult intestinal and multivisceral transplantation: rejection and infection rates in 40 recipients during the early postoperative period. *Transplant Proc* 2010; 42(1): 35-8.
 - iii. Abu-Elmagd KM, Costa G, Bond GJ, et al. Five hundred intestinal and multivisceral transplantations at a single center: major advances with new challenges. *Ann Surg* 2009; 250(4): 567-81.
- e. Add vascular composite allograft rejection, prophylaxis
 - i. Schneeberger S, Gorantla VS, Brandacher G, et al. Upper-extremity transplantation using a cell-based protocol to minimize immunosuppression. *Ann Surg* 2013; 257: 345-51.
 - ii. Kaufman CL, Ouseph R, Blair B, et al. Graft vasculopathy in clinical hand transplantation. *Am J Transplant* 2012;12(4):1004-16.
 - iii. Brandacher G, Ninkovic M, Piza-Katzer H, et al. The Innsbruck hand transplant program: update at 8 years after the first transplant. *Transplant Proc* 2009;41(2):491-4.
- f. Add kidney transplant rejection, treatment
 - i. van den Hoogen MW, Hesselink DA, van Son WJ, et al. Treatment of steroid-resistant acute renal allograft rejection with alemtuzumab. *Am J Transplant* 2013; 13(1): 192-6.
 - ii. Ciancio G, Burke GW. Alemtuzumab (Campath-1H) in kidney transplantation. *Am J Transplant* 2008; 8: 15-20.
- g. Add lung transplant rejection, treatment
 - i. Moniodis A, Townsend K, Rabin A, et al. Comparison of extracorporeal photopheresis and alemtuzumab for the treatment of chronic lung allograft dysfunction. *J Heart Lung Transplant* 2018; 37(3): 340-8.
 - ii. Ensor CR, Rihtarchik LC, Morrell MR, et al. Rescue alemtuzumab for refractory acute cellular rejection and bronchiolitis obliterans syndrome after lung transplantation. *Clin Transp.* 2017; 31: e12899.
 - iii. Reams BD, Musselwhite LW, Zaas DW, et al. Alemtuzumab in the treatment of refractory acute rejection and bronchiolitis obliterans syndrome after human lung transplantation. *Am J Transplant* 2007; 7: 2802-8.
- h. Add vascular composite allograft rejection, treatment
 - i. Tasigiorgos S, Kollar B, Turk M, et al. Five year follow-up after face transplantation. *N Engl J Med* 2019; 380:2579-2581.

- ii. Petruzzo P, Kanitakis J, Testelin S, et al. Clinicopathological findings of chronic rejection in a face grafted patient. *Transplantation* 2015; 99(12): 2644-50.
- iii. Chandraker A, Arscott R, Murphy GF, et al. The management of antibody-mediated rejection in the first presensitized recipient of a full-face allotransplant. *Am J Transplant* 2014;14(6):1446-52.

14. Immune globulin

- a. Add liver transplant rejection, treatment
 - i. Kozlowski T, Rubinas T, Nিকেleit V, et al. Liver allograft antibody-mediated rejection with demonstration of sinusoidal C4d staining and circulating donor-specific antibodies. *Liver Transpl* 2011; 17(4): 357-68.
 - ii. Urbani L, Mazzone A, De Simone P, et al. Treatment of antibody-mediated rejection with high-dose immunoglobulins in ABO-incompatible liver transplant recipient. *Transpl Int* 2007; 20(5): 467-70.
 - iii. Wilson CH, Agarwal K, Carter V, et al. Late humoral rejection in a compliant ABO-compatible liver transplant recipient. *Transplantation* 2006; 82(7): 988-9.
- b. Add heart transplant rejection, treatment
 - i. Kaczorowski DJ, Datta J, Kamoun M, Dries DL, Woo YJ. Profound hyperacute cardiac allograft rejection rescue with biventricular mechanical circulatory support and plasmapheresis, intravenous immunoglobulin, and rituximab therapy. *J Cardiothorac Surg* 2013; 16(8):48.
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- c. Add lung transplant rejection, treatment
 - i. Neuhaus K, Hohlfelder B, Bollinger J, et al. Antibody-Mediated Rejection Management Following Lung Transplantation. *Ann Pharmacother* 2021 Apr 26:10600280211012410.
 - ii. Muller YD, Aubert JD, Vionnet J, et al. Acute antibody-mediated rejection 1 week after lung transplantation successfully treated with eculizumab, intravenous immunoglobulins, and rituximab. *Transplantation* 2018; 102(6): e301-3.
 - iii. Vacha M, Chery G, Hulbert A, et al. Antibody depletion strategy for the treatment of suspected antibody-mediated rejection in lung transplant recipients: does it work? *Clin Transplant* 2017; 31(3): e12886.
 - iv. Ensor CR, Yousem SA, Marrari M, et al. Proteasome inhibitor carfilzomib-based therapy for antibody-mediated rejection of the pulmonary allograft: use and short-term findings. *Am J Transplant* 2017; 17(5): 1380-8.

- v. Witt CA, Gaut JP, Yusen RD, et al. Acute antibody mediated rejection after lung transplantation. *J Heart Lung Transplant* 2013; 32(10): 1034-40.
 - vi. Stuckey LJ, Kamoun M, Chan KM. Lung transplantation across donor-specific anti-human leukocyte antigen antibodies: utility of bortezomib therapy in early graft dysfunction. *Ann Pharmacother* 2012; 46(1): e2.
- d. Add pancreas transplant rejection, treatment
- i. Hartono C, Kim J, McDermott J, et al. High-dose intravenous immunoglobulin (IVIg) adjuvant therapy for cell-mediated pancreas transplant rejection. *Transplantation* 2013; 96(5): e43-4.
 - ii. Melcher ML, Olson JL, Baster-Lowe LA, et al. Antibody-mediated rejection of a pancreas allograft. *Am J Transplant* 2006; 6(2): 432-8.
- e. Add intestine transplant rejection, treatment
- i. Wu GS, Zhao QC, Li ZS, et al. Successful rescue of late-onset antibody-mediated rejection 12 years after living-donor intestinal transplantation. *Transplant Proc* 2017; 49(1): 232-6.
- f. Add vascular composite allograft rejection, treatment
- i. Tasigiorgos S, Kollar B, Turk M, et al. Five year follow-up after face transplantation. *N Engl J Med* 2019; 380:2579-2581.
 - ii. Chandraker A, Arscott R, Murphy GF, et al. The management of antibody-mediated rejection in the first presensitized recipient of a full-face allotransplant. *Am J Transplant* 2014;14(6):1446-52.
- g. Add liver transplant, pre-transplant desensitization
- i. Kim SH, Lee EC, Shim JR, et al. A simplified protocol using rituximab and immunoglobulin for ABO-incompatible low-titre living donor liver transplantation. *Liver Int* 2018; 38(5) :932-9.
 - ii. Kim JD, Choi DL, Kim SG, et al. Single-center experience of ABO-incompatible living-donor liver transplantation with a new simplified intravenous immunoglobulin protocol: A propensity score-matching analysis. *Transplant Proc* 2016; 48(4): 1134-8.
- h. Add heart transplant, pre-transplant desensitization
- i. Kobashigawa JA, Patel JK, Kittleson MM, et al. The long-term outcome of treated sensitized patients who undergo heart transplantation. *Clin Transplant* 2011; 25(1): E61-7.
 - ii. Pisani BA, Mullen GM, Malinowska K, et al. Plasmapheresis with intravenous immunoglobulin G is effective in patients with elevated panel reactive antibody prior to cardiac transplantation. *J Heart Lung Transplant* 1999; 18(7): 701-6.
 - iii. John R, Lietz K, Burke E, et al. Intravenous immunoglobulin reduces anti-HLA alloreactivity and shortens waiting time to cardiac transplantation in highly sensitized left ventricular assist device recipients. *Circulation* 1999; 100(19 Suppl): I1229-35.
- i. Add intestine transplant, pre-transplant desensitization

- i. Gondolesi G, Blondeau B, Maurette R, et al. Pretransplant immunomodulation of highly sensitized small bowel transplant candidates with intravenous immune globulin. *Transplantation* 2006; 81(12): 1743-6.

15. Rituximab

- a. Add intestine transplant rejection, prophylaxis
 - i. Vianna RM, Mangus RS, Fridell JA, et al. Induction immunosuppression with thymoglobulin and rituximab in intestinal and multivisceral transplantation. *Transplantation* 2008; 85(9): 1290-3.
- b. Add kidney transplant rejection, treatment
 - i. Sautenet B, Blancho G, Buchler M, et al. One-year results of the effects of rituximab on acute antibody-mediated rejection in renal transplantation: RITUX ERAH, a multicenter double-blind randomized placebo-controlled trial. *Transplantation* 2016; 100(2): 391-9.
 - ii. Immenschuh S, Zilian E, Dammrich ME, et al. Indicators of treatment responsiveness to rituximab and plasmapheresis in antibody-mediated rejection after kidney transplantation. *Transplantation* 2015; 99(1): 56-62.
 - iii. Billing H, Rieger S, Susal C, et al. IVIG and rituximab for treatment of chronic antibody-mediated rejection: a study in paediatric renal transplantation with a 2-year follow-up. *Transpl Int* 2012; 25(11): 1165-73.
 - iv. Kaposztas Z, Podder H, Mauiyyedi S, et al. Impact of rituximab therapy or treatment of acute humoral rejection. *Clin Transplant* 2009; 23(1): 63-73.
 - v. Becker YT, Becker BN, Pirsch JD, et al. Rituximab as treatment for refractory kidney transplant rejection. *Am J Transplant* 2004; 4(6): 996-1001.
- c. Add liver transplant rejection, treatment
 - i. Kozlowski T, Rubinas T, Nickeleit V, et al. Liver allograft antibody-mediated rejection with demonstration of sinusoidal C4d staining and circulating donor-specific antibodies. *Liver Transpl* 2011; 17(4): 357-68.
 - ii. Wilson CH, Agarwal K, Carter V, et al. Late humoral rejection in a compliant ABO-compatible liver transplant recipient. *Transplantation* 2006; 82(7): 988-9.
- d. Add heart transplant rejection, treatment
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