

13. Bölüm

UTERUS (TORSİYON/DETORSİYON) İSKEMİ REPERFÜZYON

Esra İŞÇİ BOSTANCI¹

Ayşe Hande ARPACI²

13.1. Uterus Fizyolojisi

Uterus korpus ve serviksten oluşan fibromusküler bir organdır. Mesane arkasında, rektumun önünde konumlanmıştır. Ortalama 7.5 cm uzunluğunda, 3.5 cm genişliğinde, 2.5 cm kalınlığındadır. Ağırlığı ortalama 60 g'dır. Gebelikte büyür ve genişler, ağırlığı 1000 g'ı bulur. Doğumdan sonra normal boyutuna geri döner, menopozal dönemde ise belirgin bir şekilde küçülür.

13.1.1. Korpus

Uterin kornular fallop tüpünün interstisyel kısmını içerir. Uterusun en içteki tabakası **endometriyum**, kolumnar epitel ve stromadan oluşur. Endometriumun fonksiyonel tabakası hormonal olarak duyarlı spiral arteriollerini içerir. Bu arteriollerin spazmı sonucu her menstrual siklus sonucu bu tabaka dökülür. Daha derindeki bazal tabaka ise bazal arterler tarafından beslenerek endometriumun rejenerasyonundan sorumlu, siklusa dökülmeyen tabakadır. Uterusun düz kaslardan oluşan tabakası ise **myometriyum** olarak adlandırılır. **Perimetriyum** ise uterusun serozal yüzeyini örten peritoneal mezotel tarafından oluşturulur.

¹ Dr. Öğr. Üyesi, Gazi Üniversitesi Tıp Fakültesi, Kadın Hastalıkları ve Doğum AD., dresrai@yahoo.com.tr

² Doç. Dr., Ankara Üniversitesi Diş Hekimliği Fakültesi, Ağız, Diş ve Çene Cerrahisi AD., (Anesteziyoloji ve Reanimasyon Uzmanı), handarpaci@yahoo.com

KAYNAKLAR

1. W.Ko A, Cundiff GW, çeviri Turan H. Kadın Pelvisinin Anatomisi. Bankowski BJ, Hearne AE, Lambrou NC, Fox HE, Wallach EE. The Johns Hopkins Manual of Gynecology and Obstetrics. 2005, syf:253-275.
2. Selçuk I, Meydanlı MM. Pelvik retroperitoneal vaskülarizasyon. Selçuk I, Tatar I, Özdal B, Meydanlı MM, Moraloğlu Tekin Ö. Pelvik Anatomi Jinekolojik Cerrahi Atlası. 2021; syf 110-135.
3. Kido A, Togashi K. Uterine anatomy and function on cine magnetic resonance imaging. *Reprod Med Biol* 2016;15(4):191-99.
4. Ameer MA, Fagan SE, Sosa-Stanley JN, Peterson DC. StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Aug 10, 2020. Anatomy, Abdomen and Pelvis, Uterus.
5. Rosner J, Samardzic T, Sarao MS. StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Oct 6, 2020. Physiology, Female Reproduction.
6. Kapila V, Chaudhry K. StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Aug 11, 2020. Physiology, Placenta.
7. Chwalisz K, Garfield RE. Regulation of the uterus and cervix during pregnancy and labor. Role of progesterone and nitric oxide. *Ann N Y Acad Sci* 1997;828:238-53.
8. Hutchison J, Mahdy H, Hutchison J. StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Aug 23, 2020. Stages of Labor.
9. Olson DM, Mijovic JE, Sadowsky DW. Control of human parturition. *Semin Perinatol* 1995;19(1):52-63.
10. Fageeh W, Raffa H, Jabbad H, Marzouki A. Transplantation of the human uterus. *Int J Gynecol Obstet* 2002;76:245-51.
11. Racho El-Akouri R, Kurlberg G, Brännström M. Successful uterine transplantation in the mouse: pregnancy and post-natal development of offspring. *Hum Reprod* 2003;18(10):2018-23.
12. Akgör U. Deney Hayvanları Uterus Transplantasyon Modeli. Bora ES, Özlü C. Klinik Bilimlerde Deney Hayvanı Modelleri. 2020: syf 713-19.
13. Brännström M, Johannesson L, Bokström H, Kvarnström N, Mölne J, Dahm-Kähler P, et al. Livebirth after uterus transplantation. *Lancet* 2015;385(9968):607-16.
14. Jones BP, Saso S, Bracewell-Milnes T, Thum MY, Nicopoulos J, Diaz-Garcia C, et al. Human uterine transplantation: a review of outcomes from the first 45 cases. *BJOG* 2019;126(11):1310-19.
15. Aslan M, Erkanli Senturk G, Akkaya H, Sahin S, Yilmaz B. The effect of oxytocin and Kisspeptin-10 in ovary and uterus of ischemia-reperfusion injured rats. *Taiwan J Obstet Gynecol* 2017;56(4):456-62.
16. Dogan H, Risvanli A, Saat N, Gul HF, Ilhan N, Seker I, et al. The effect of melatonin in rats with uterine torsion on uterus contractions, and levels of ADMA, SDMA, arginine, Hsp90, TLR4, and NF-κB. *Ankara Univ Vet Fak Derg* 2019;66:267-72.
17. Canillioglu YE, Senturk GE. Alterations of IL-1 and VEGF After Ischemia-Reperfusion Injured Uterus and Ovary in Rats. *Medeniyet Med J* 2020;35:106-15.
18. Sahin Ersoy G, Kurek Eken M, Cevik O, Cilingir OT, Tal R. Mycophenolate mofetil attenuates uterine ischaemia/reperfusion injury in a rat model. *Reprod Biomed Online* 2017;34(2):115-23.
19. Puntambekar S, Telang M, Kulkarni P, Puntambekar S, Jadhav S, Panse M, et al. Laparoscopic-Assisted Uterus Retrieval From Live Organ Donors for Uterine Transplant: Our Experience of Two Patients. *J Minim Invasive Gynecol* 2018;25(4):622-31.
20. Puntambekar S, Puntambekar S, Telang M, Kulkarni P, Date S, Panse M, et al. Novel Anatomic Technique for Uterine Transplant Using Utero-ovarian Veins for Venous Drainage

- and Internal Iliac Arteries for Perfusion in Two Laparoscopically Harvested Uteri. *J Minim Invasive Gynecol* 2019;26(4):628-35.
21. Brännström M, Dahm-Kähler P, Kvarnström N. Robotic-assisted surgery in live-donor uterus transplantation. *Fertil Steril* 2018;109(2):256-7.
 22. Chmel R, Novackova M, Janousek L, Matecha J, Pastor Z, Maluskova J, et al. Revaluation and lessons learned from the first nine cases of a Czech uterus transplantation trial: four deceased donor and five living donor uterus transplantations. *Am J Transplant* 2018;19:855-64.
 23. Erman Akar M, Ozkan O, Ozkan O, Erdogan O, Cincik M, Mutlu D, et al. Short term follow up results of the first human uterus transplantation from cadaver. *J Minim Invasive Gynecol* 2012;19: S83. <https://doi.org/10.1016/j.jmig.2012.08.610>.
 24. Sahin TC. Testiste oluşturulan iskemi reperfüzyon modelinde montelukast'ın koruyucu etkisi. Yüksek Lisans Tezi, Eskişehir Osmangazi Üniversitesi Sağlık Bilimleri Enstitüsü, 2016.
 25. Yaman LS, Göğüş O, Müftüoğlu YZ, Küpeli S, Anafarta K, Şafak SM, et al. Üroloji. Güneş Kitabevi, 1990.
 26. Silay MS, Toklu H, Özağarı A, Aydın M, Tetik Ş, Şener G, et al. Montelukast prevents testes against ischemia-reperfusion injury through suppression of iNOS expression. *Türk J Urol* 2014;40(4):221-7.
 27. Yagmurdur H, Ayyildiz A, Karaguzel E, Akgul T, Ustun H, Germiyanoglu C. Propofol reduces nitric oxide-induced apoptosis in testicular ischemia-reperfusion injury by downregulating the expression of inducible nitric oxide synthase. *Acta Anaesthesiol Scand* 2008;52(3):350-7.
 28. Ergun Y, Koc A, Dolapcioglu K, Akaydin Y, Dogruer G, Kontas T, et al. The protective effect of erythropoietin and dimethylsulfoxide on ischemia-reperfusion injury in rat ovary. *Eur J Obstet Gynecol Reprod Biol* 2010;152(2):186-90.
 29. Ishikawa T, Kondo Y, Goda K, Fujisawa M. Overexpression of endothelial nitric oxide synthase in transgenic mice accelerates testicular germ cell apoptosis induced by experimental cryptorchidism. *J Androl* 2005;26(2):281-8.
 30. Oguzhan O, Erdal H, Yonden Z. İskemi-Reperfüzyon Hasarı ve Oksidatif Stres İlişkisine Biyokimyasal Bakış. *Mustafa Kemal Üniv Tıp Dergisi* 2015; 6(23): 27-33.
 31. Homer-Vanniasinkam S, Crinnion JN, Gough MJ. Post-ischaemic organ dysfunction: a review. *Eur J Vasc Endovasc Surg* 1997;14(3):195-203.
 32. Serracino-Ingloff F, Habib NA, Mathie RT. Hepatic ischemia-reperfusion injury. *Am J Surg* 2001;181(2):160-6.
 33. Suzuki M, Asako H, Kubes P, Jennings S, Grisham MB, Granger DN. Neutrophil-derived oxidants promote leukocyte adherence in postcapillary venules. *Microvasc Res* 1991;42(2):125-38.
 34. Zhang W, Smith C, Shapiro A, Monette R, Hutchison J, Stanimirovic D. Increased expression of bioactive chemokines in human cerebromicrovascular endothelial cells and astrocytes subjected to simulated ischemia in vitro. *J Neuroimmunol* 1999;101(2):148-60.
 35. Pasaoglu H. Biyolojik Oksidasyon. İçinde: Harper Biyokimya N Dikmen, Daryl K. Granner. Harper Biyokimya. 11 Baskı. Nobel Tıp Kitabevi, 2004: 133.
 36. Rodriguez C, Mayo JC, Sainz RM, Antolín I, Herrera F, Martín V, et al. Regulation of antioxidant enzymes: a significant role for melatonin. *J Pineal Res* 2004;36(1):1-9.
 37. Yavuzer N. Karaciğerde İskemi Reperfüzyon ile İndüklenmiş Rejenerasyon Modelinde Kompleman İnhibitörünün Rolü. Uzmanlık Tezi, Başkent Üniversitesi Tıp Fakültesi. Ankara, 2008, sy122.
 38. Ault JG, Lawrence DA. Glutathione distribution in normal and oxidatively stressed cells. *Exp Cell Res* 2003;285(1):9-14.
 39. Dickinson DA, Forman HJ. Cellular glutathione and thiols metabolism. *Biochem Pharmacol* 2002;64(5-6):1019-26.
 40. Niki E. Antioxidants in relation to lipid peroxidation. *Chem Phys Lipids* 1987;44(2-4):227-53.
 41. Porter NA. Chemistry of lipid peroxidation. *Methods Enzymol* 1984;105:273-82.

42. Silalahi J. Anticancer and health protective properties of citrus fruit components. *Asia Pac J Clin Nutr* 2002;11(1):79-84.
43. González-Pérez O, Moy-López NA, Guzmán-Muñiz J. El alfa-tocoferol y el acido alfa-lipoico. Una sinergia antioxidante con potencial en medicina preventiva [Alpha-tocopherol and alpha-lipoic acid. An antioxidant synergy with potential for preventive medicine]. *Rev Invest Clin* 2008;60(1):58-67.
44. Akkuş İ. Serbest Radikaller ve Fizyopatolojik Etkileri. 1. Baskı, Mimoza Yayınları, 1995, sy 1-60.
45. Slater TF. Free-radical mechanisms in tissue injury. *Biochem J* 1984;222(1):1-15.
46. Chuffa LGA, Lupi LA, Cuciello MS, Silveira HS, Reiter RJ, Seiva FRE. Melatonin Promotes Uterine and Placental Health: Potential Molecular Mechanisms. *Int J Mol Sci* 2019;21(1):300. doi: 10.3390/ijms21010300.
47. Eraslan S, Hamernik RJ, Hardy JD. Replantation of uterus and ovaries in dogs, with successful pregnancy. *Arch Surg* 1966;92(1):9-12.
48. Hanafy A, Diaz-Garcia C, Olausson M, Brännström M. Uterine transplantation: one human case followed by a decade of experimental research in animal models. *Aust N Z J Obstet Gynaecol* 2011;51(3):199-203.
49. Saso S, Petts G, David AL, Thum MY, Chatterjee J, Vicente JS, et al. Achieving an early pregnancy following allogeneic uterine transplantation in a rabbit model. *Eur J Obstet Gynecol Reprod Biol* 2015;185:164-9.