

KOAGÜLOPATİ VE HEMATOLOJİK NEDENLER

9 BÖLÜM

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GİRİŞ

Postpartum kanama (PPK), hem gelişmiş hem de gelişmekte olan ülkelerde maternal mortalitenin en sık nedenlerinden biri olmaya devam etmektedir. Dünya Sağlık Örgütü, PPK'yı doğum sonrası ilk 24 saat içinde ≥ 500 mL (vajinal doğum) veya ≥ 1000 mL (sezaryen) kan kaybı olarak tanımlamaktadır (1). Bu kanamalar, sıklıkla uterin atoni, plasental retansiyon ya da doğum travmaları gibi obstetrik nedenlerle ilişkilendirilse de altta yatan hematolojik bozukluklar da önemli ve sıklıkla göz ardı edilen etkenlerdir. Bu nedenle, PPK yönetiminde etkili ve hızlı müdahale için obstetrik değerlendirmelerin yanı sıra koagülasyon sisteminin bütüncül olarak analiz edilmesi büyük önem taşımaktadır (2).

Gebelikte PPK'yla ilişkili olabilen hematolojik hastalıkların başlıcaları; gestasyonel trombositopeni, immün trombositopenik purpura (ITP), dissemine intravasküler koagülasyon (DİK), hemofili olarak sayılabilir.

Gebelikte trombositopeni, %7–10 gibi yüksek bir insidansla görülmekte olup, özellikle trombosit sayısının $100.000/\text{mL}$ 'nin altında olduğu durumlarda PPK riski artmaktadır. Gestasyonel trombositopeni çoğunlukla iyi bir seyir gösterse de, ITP, HELLP (hemoliz, yüksek karaciğer enzimleri, düşük trombosit) sendromu gibi daha ciddi tablolarla ayırıcı tanısının yapılması kritik öneme sahiptir (3).

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Geç komplikasyonlar: Solunum yetmezliği, transfüzyonla ilişkili akut akciğer hasarı (TRALI), Sepsis, transfüzyonla ilişkili volüm yüklenmesi, trombotik komplikasyonlar (67).

4.5. MTP sonrası planlanan ideal kan değerleri

Ortalama arter basıncı (OAB) yaklaşık 60 mmHg, sistolik arter basıncı 80-100 mmHg (hipertansif hastalarda daha yüksek OAB'ı hedeflemek gerekebilir)

Hb 7-9 g/dl

INR <1,5; aktif PTT <42 sn

Fibrinojen >1,5-2 g/L

Trombositler $>50 \times 10^9 /L$

pH 7.35-7.45

Vücut sıcaklığı $>35,0^{\circ}C$

Baz açığı $<3,0/laktat <2 \text{ mEq/L}$.

(68)

KAYNAKLAR

1. World Health Organization. WHO recommendations for the prevention and treatment of postpartum haemorrhage. Geneva: WHO Press; 2012.
2. American College of Obstetricians and Gynecologists. ACOG Practice Bulletin No. 183: Postpartum Hemorrhage. Obstet Gynecol. 2017;130(4):e168–e186. doi:10.1097/AOG.0000000000002351.
3. American College of Obstetricians and Gynecologists. ACOG Practice Bulletin No. 207: Thrombocytopenia in Pregnancy. Obstet Gynecol. 2019;133(3):e181–e193. doi:10.1097/AOG.0000000000003100.
4. Levi M, Thachil J, Iba T, et al. ISTH guidance for the diagnosis and treatment of DIC. J Thromb Haemost. 2023;21(1):8–23. doi:10.1111/jth.15984.
5. World Federation of Hemophilia. Guidelines for the Management of Hemophilia. 3rd ed. Montreal: WFH; 2020. DOI: 10.1111/hae.14046
6. Türk Hematoloji Derneği. İmmün Trombositopenik Purpura (İTP) Tanı ve Tedavi Rehberi. Ankara: THD Yayınları; 2022.
7. Gernsheimer T, James AH, Stasi R. How I treat thrombocytopenia in pregnancy. Blood. 2013;121(1):38–47. doi:10.1182/blood-2012-08-448944.
8. Cines DB, Levine LD. Thrombocytopenia in pregnancy. Blood. 2017;130:2271–2277. doi:10.1182/blood-2017-05-781971.
9. Reese JA, Peck JD, Deschamps DR, et al. Platelet counts during pregnancy. N Engl J Med. 2018;379:32–43. doi:10.1056/NEJMoa1802897.
10. Valera MC, Parant O, Vayssiere C, Arnal JF, Payrastra B. Physiologic and pathologic changes of platelets during pregnancy. Platelets. 2010;21:587–595. doi:10.3109/09537104.2010.509828.
11. Win N, Rowley M, Pollard C, et al. Severe (incidental) thrombocytopenia in pregnancy: to treat

- or not to treat? *Hematology*. 2005;10(1):69–72. doi:10.1080/10245330400026268.
12. Rottenstreich A, Israeli N, Levin G, et al. Clinical characteristics, neonatal risk and recurrence rate of pregnancy-associated thrombocytopenia with platelet count $<100 \times 10^9/L$. *Eur J Obstet Gynecol Reprod Biol*. 2018;231:75–79. doi:10.1016/j.ejogrb.2018.10.026.
13. Schwartz RS. Immune thrombocytopenic purpura — from agony to ecstasy. *N Engl J Med*. 2007;357:2299–2301. doi:10.1056/NEJMe0707126.
14. Perepu U, Rosenstein L. Maternal thrombocytopenia in pregnancy. *Obstet Gynecol Surv*. 2013;3:6. Available from: <http://ir.uiowa.edu/pog/>.
15. Fujimura K, Harada Y, Fujimoto T, et al. Nationwide study of idiopathic thrombocytopenic purpura in pregnant women and its clinical effect on neonates. *Int J Hematol*. 2002;75(4):426–433. DOI:10.1007/BF02982137
16. van Veen JJ, Nokes TJ, Makris M. The risk of spinal haematoma following neuraxial anaesthesia or lumbar puncture in thrombocytopenic individuals. *Br J Haematol*. 2010;148(1):15–25. DOI: 10.1111/j.1365-2141.2009.07899.x
17. Michel M, Novoa MV, Bussel JB. Intravenous anti-D in the treatment of immune thrombocytopenic purpura (ITP) during pregnancy. *Br J Haematol*. 2003;123(1):142–146. doi: 10.1046/j.1365-2141.2003.04567.x.
18. American Society of Hematology. Clinical Practice Guidelines on Thrombocytopenia in Pregnancy. Washington, DC: ASH; 2013.
19. Webert KE, Mittal R, Sigouin C, et al. A retrospective 11-year analysis of obstetric patients with idiopathic thrombocytopenic purpura. *Blood*. 2003;102(13):4306–4311. DOI: 10.1182/blood-2002-10-3317
20. Winkelhorst D, Murphy MF, Greinacher A, et al. Antenatal management in fetal and neonatal alloimmune thrombocytopenia: a systematic review. *Blood*. 2017;129(11):1538–1547. DOI: 10.1182/kan-2016-10-739656
21. Gernsheimer T, James AH, Stasi R. How I treat thrombocytopenia in pregnancy. *Blood*. 2013;121:38–47. doi:10.1182/blood-2012-08-448944.
22. Haram K, Svendsen E, Abildgaard U. The HELLP syndrome: clinical issues and management. *BMC Pregnancy Childbirth*. 2009;9:8. doi:10.1186/1471-2393-9-8.
23. Myers B. Diagnosis and management of maternal thrombocytopenia in pregnancy. *Br J Haematol*. 2012;158:3–15. doi:10.1111/j.1365-2141.2012.09135.x.
24. Nelson-Piercy C. Handbook of Obstetric Medicine. 4th ed. London: Informa Healthcare; 2010. <https://doi.org/10.1201/9780429330766>
25. Dashe JS, Ramin SM, Cunningham FG. Long-term outcome of thrombotic microangiopathy (thrombotic thrombocytopenic purpura and hemolytic uremic syndrome) in pregnancy. *Obstet Gynecol*. 1998;91:662–668. doi:10.1016/S0029-7844(98)00031-3.
26. Scully M, Hunt BJ, Benjamin S, et al. Guidelines on the diagnosis and management of thrombotic thrombocytopenic purpura and other thrombotic microangiopathies. *Br J Haematol*. 2012;158:323–335. doi:10.1111/j.1365-2141.2012.09167.x.
27. Vesely SK, Li X, McMinn JR, et al. Pregnancy outcomes after recovery from thrombotic thrombocytopenic purpura–hemolytic uremic syndrome. *Transfusion*. 2004;44:1149–1158. doi:10.1111/j.1537-2995.2004.03422.x.
28. Zheng XL, Sadler JE. Pathogenesis of thrombotic microangiopathies. *Annu Rev Pathol*. 2008;3:249–277. doi:10.1146/annurev.pathmechdis.3.121806.154311.
29. Terrell DR, Williams LA, Vesely SK, et al. The incidence of thrombotic thrombocytopenic purpura–hemolytic uremic syndrome: all patients, idiopathic patients, and those with severe ADAMTS-13 deficiency. *J Thromb Haemost*. 2005;3:1432–1436. doi:10.1111/j.1538-7836.2005.01436.x.
30. Martin JN Jr, Bailey AP, Rehberg JF, et al. Thrombotic thrombocytopenic purpura in 166 preg-

- nancies: 1955–2006. *Am J Obstet Gynecol.* 2008;199:98–104. doi:10.1016/j.ajog.2008.03.011.
31. Royal College of Obstetricians and Gynaecologists. Guidelines for the management of inherited bleeding disorders in pregnancy. *Med J Aust.* 2019;210(7):326–332. DOI'si 10.5694/mja2.50123
 32. Bolton-Maggs PHB, Pasi KJ. Haemophilia. *Lancet.* 2003;361(9371):1801–1809. DOI: 10.1016/S0140-6736(03)13405-8
 33. Srivastava A, et al. Guidelines for the management of hemophilia. *Haemophilia.* 2013;19(1):e1–e47. doi:10.1111/j.1365-2516.2012.02909.x.
 34. Pavord SR, Rayment R, Madan B, et al. Management of inherited bleeding disorders in pregnancy. Green-top Guideline No. 71 (in association with UKHCDO). *BJOG.* 2017;124:e193–e263. doi:10.1111/1471-0528.14592.
 35. Plug I, Mauser-Bunschoten EP, Brocker-Vriends AH, et al. Bleeding in carriers of haemophilia. *Blood.* 2006;108:52–56. DOI: 10.1182/blood-2005-09-3879
 36. Brenner B. Haemostatic changes in pregnancy. *Thrombosis Research.* 2004;114(5-6):409–14. doi:10.1016/j.thromres.2004.08.004.
 37. Levi M, van der Poll T. A brief history of disseminated intravascular coagulation. *Semin Thromb Hemost.* 2014;40:874–880. DOI: 10.1055/s-0034-1395155
 38. Taylor FB Jr, Toh CH, Hoots WK, et al. Towards definition, clinical and laboratory criteria, and a scoring system for disseminated intravascular coagulation. *Thromb Haemost.* 2001;86:1327–1330. DOI: 10.1055/s-0037-1616068
 39. Erez O, Novack L, Beer-Weisel R, et al. DIC score in pregnant women: diagnostic and prognostic significance. *Am J Obstet Gynecol.* 2014;211(1):44.e1–44.e8. DOI: 10.1371/journal.pone.0093240
 40. Levi M. Disseminated intravascular coagulation: what's new? *J Thromb Haemost.* 2009;7(S1):13–16. DOI:10.1016/j.ccc.2005.02.001
 41. Delabranche X, Boissramé-Helms J, Asfar P, et al. Disseminated intravascular coagulation: current perspectives. *Crit Care.* 2014;18(3):207. DOI: 10.1097/CCM.0000000000001836
 42. Türkiye Hematoloji Derneği. Dissemine İntravasküler Koagülasyon Tanı ve Tedavi Kılavuzu. *HematoLog.* 2012;2(2):97–100.
 43. Taylor FB Jr, Toh CH, Hoots WK, Wada H, Levi M. Towards definition, clinical and laboratory criteria, and a scoring system for disseminated intravascular coagulation. *Thromb Haemost.* 2001;86:1327–1330. DOI: 10.1055/s-0037-1616068
 44. Turan A, Yang D, Bonilla A, Shiba A, Sessler DI, Saager L, et al. Morbidity and mortality after massive transfusion in non-cardiac surgery. *Can J Anesth.* 2013;60:761–770. doi:10.1007/s12630-013-9937-3.
 45. Dutton RP, Lee LA, Stephens LS, Posner KL, Davies JM, Domino KB. Major hemorrhage: a report from the Anesthesia Closed Claims Project. *Anesthesiology.* 2014;121:450–458. doi:10.1097/ALN.0000000000000369.
 46. Raymer JM, Flynn LM, Martin RF. Massive blood transfusion in the surgical patient. *Surg Clin North Am.* 2012;92:221–234. doi:10.1016/j.suc.2012.01.008.
 47. Chidester SJ, Williams N, Wang W, Groner JI. Pediatric massive transfusion protocol. *J Trauma Acute Care Surg.* 2012;73:1273–1277. doi:10.1097/TA.0b013e318265d267.
 48. American Society of Anesthesiologists Committee on Blood Management. Massive transfusion protocol (MTP) for hemorrhagic shock. [Accessed 27 Sept 2014]. Available from: <https://www.asahq.org/For-Members/About-ASA/ASA-Committees/Committee-on-Blood-Management.aspx>
 49. Bolliger D, Görlinger K, Tanaka KA. Pathophysiology and treatment of coagulopathy in massive bleeding and hemodilution. *Anesthesiology.* 2010;113:1205–1219. doi:10.1097/ALN.0b013e3181f22b5a.

50. Riskin DJ, Tsai TC, Riskin L, Hernandez-Boussard T, Purtill M, Maggio PM, et al. Massive transfusion protocols: the role of aggressive resuscitation ratios in reducing mortality. *J Am Coll Surg*. 2009;209:198–205. doi:10.1016/j.jamcollsurg.2009.04.016.
51. Nunez TC, Young PP, Holcomb JB, Cotton BA. Creation, implementation, and maturation of a massive transfusion protocol for the exsanguinating trauma patient. *J Trauma*. 2010;68:1498–1505. doi:10.1097/TA.0b013e3181d3cc25.
52. O'Keeffe T, Refaai M, Tchorz K, Forestner JE, Sarode R. A massive transfusion protocol to reduce blood component use and costs. *Arch Surg*. 2008;143:686–690. doi:10.1001/archsurg.143.7.686.
53. Borgman MA, Spinella PC, Perkins JG, Grathwohl KW, Repine T, Beekley AC, et al. The ratio of blood products transfused affects mortality in patients receiving massive transfusions at a combat support hospital. *J Trauma*. 2007;63(4):805–813. doi:10.1097/TA.0b013e3181271b8f.
54. Perkins JG, Cap AP, Spinella PC, Blackburne LH, Grathwohl KW, Repine TB, et al. An evaluation of the impact of apheresis platelets used in massively transfused trauma patients. *J Trauma*. 2009;66(4 Suppl):S77–S84; discussion S-5. doi:10.1097/TA.0b013e31819d8b21.
55. Peltan ID, Vande Vusse LK, Maier RV, Watkins TR. An international normalized ratio-based definition of acute traumatic coagulopathy is associated with mortality, venous thromboembolism, and multiple organ failure after injury. *Crit Care Med*. 2015;43(7):1429–1438. doi:10.1097/CCM.0000000000000967.
56. David JS, Levrat A, Inaba K, Macabeo C, Rugeri L, Fontaine O, et al. Utility of a point-of-care device for rapid determination of prothrombin time in trauma patients: a preliminary study. *J Trauma Acute Care Surg*. 2012;72(3):703–707. doi:10.1097/TA.0b013e318247b9eb.
57. Holcomb JB, Tilley BC, Baraniuk S, Fox EE, Wade CE, Podbielski JM, et al. Transfusion of plasma, platelets, and red blood cells in a 1:1:1 vs 1:1:2 ratio and mortality in patients with severe trauma: the PROPPR andomized clinical trial. *JAMA*. 2015;313(5):471–482. doi:10.1001/jama.2015.12.
58. Delaney M, Stark PC, Suh M, Triulzi DJ, Hess JR, Steiner ME, et al. Massive transfusion in cardiac surgery: the impact of blood component ratios on clinical outcomes and survival. *Anesth Analg*. 2017;124(6):1777–1782. doi:10.1213/ANE.0000000000002006.
59. Furie B, Furie BC. Mechanisms of thrombus formation. *N Engl J Med*. 2008;359(9):938–949. doi:10.1056/NEJMra0801082.
60. McQuilten ZK, Bailey M, Cameron PA, Stanworth SJ, Venardos K, Wood EM, et al. Fibrinogen concentration and use of fibrinogen supplementation with cryoprecipitate in patients with critical bleeding receiving massive transfusion: a bi-national cohort study. *Br J Haematol*. 2017;179(1):131–141. doi:10.1111/bjh.14821.
61. Godier A, Greinacher A, Faraoni D, Levy JH, Samama CM. Use of factor concentrates for the management of perioperative bleeding: guidance from the SSC of the ISTH. *J Thromb Haemost*. 2018;16(1):170–174. doi:10.1111/jth.13943.
62. Boer C, Meesters MI, Milojevic M, Benedetto U, Bolliger D, von Heymann C, et al. 2017 EA-CTS/EACTA guidelines on patient blood management for adult cardiac surgery. *J Cardiothorac Vasc Anesth*. 2018;32(1):88–120. doi:10.1053/j.jvca.2017.06.026.
63. Cardenas JC, Zhang X, Fox EE, Cotton BA, Hess JR, Schreiber MA, et al. Platelet transfusions improve hemostasis and survival in a substudy of the prospective, randomized PROPPR trial. *Blood Adv*. 2018;2(14):1696–1704. doi:10.1182/bloodadvances.2018017699.
64. Roberts I, Shakur H, Afolabi A, Brohi K, Coats T, Dewan Y, et al. The importance of early treatment with tranexamic acid in bleeding trauma patients: an exploratory analysis of the CRASH-2 randomised controlled trial. *Lancet*. 2011;377(9771):1096–1101.e2. doi:10.1016/S0140-6736(11)60278-X.
65. Cannon JW, Khan MA, Raja AS, Cohen MJ, Como JJ, Cotton BA, et al. Damage control re-

- suscitation in patients with severe traumatic hemorrhage: a practice management guideline from the Eastern Association for the Surgery of Trauma. *J Trauma Acute Care Surg.* 2017;82(3):605–617. doi:10.1097/TA.0000000000001333.
66. Meng ZH, Wolberg AS, Monroe DM III, Hoffman M. The effects of temperature and pH on factor VIIa activity: implications for high-dose factor VIIa efficacy in hypothermic and acidotic patients. *J Trauma.* 2003;55:886–891. doi:10.1097/01.TA.0000066184.20808.A5.
67. Sihler KC, Napolitano LM. Complications of massive transfusion. *Chest.* 2010;137:209–220. doi:10.1378/chest.09-0252.
68. Stern SA, Dronen SC, Wang X. Multiple resuscitation regimens in a near-fatal porcine aortic injury hemorrhage model. *Acad Emerg Med.* 1995;2(2):89–97. doi:10.1111/j.1553-2712.1995.tb03206.x.