아주대학교의료원
Ajou University Medical Center

The 38th KTCVS & the 4th AAPCHS in Seoul 2024

Patient blood management (Pre, intra, post operative) Of ERAS in cardiac surgery

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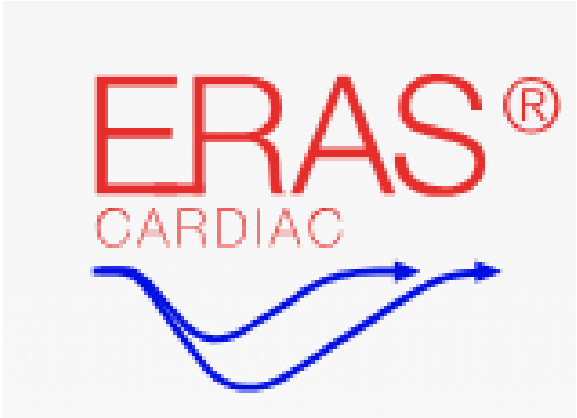
01 ERAS in cardiac surgery



Enhanced Recovery After Surgery (ERAS)
: Multimodal, transdisciplinary care improvement initiative to promote recovery of patients undergoing surgery

01 ERAS in cardiac surgery

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EXPERT CONSENSUS STATEMENT

Perioperative Care in Cardiac Surgery: A Joint Consensus Statement by the Enhanced Recovery After Surgery (ERAS) Cardiac Society, ERAS International Society, and The Society of Thoracic Surgeons (STS)

Check for updates

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02 Patient blood management in ERAS

TABLE 4 Components of a Patient Blood Management Program

Preoperative Anemia and Iron Deficiency Screening and Optimization
A patient blood management program, led by a multidisciplinary team of health care providers, should be part of a comprehensive strategy to avoid unnecessary transfusion.
Anemia and iron deficiency assessment and treatment with B_{12}, folate, and intravenous iron preparations, as indicated, is reasonable to reduce blood transfusion.
Preoperative administration of intravenous iron and/or erythropoietin-stimulating agents is reasonable to increase red cell mass for anemic patients.
Minimize Blood Loss and Hemodilution
Laboratory measurement of antiplatelet drug effect for patients on preoperative dual antiplatelet therapy is reasonable to guide timing of surgery.
Use of synthetic antifibrinolytic agents such as epsilon-aminocaproic acid (EACA) or tranexamic acid are shown to reduce blood transfusion.
Reduced priming volume in the cardiopulmonary bypass circuit reduces hemodilution and blood transfusion.
Retrograde autologous priming of the cardiopulmonary bypass circuit reduces hemodilution and blood transfusion.
Routine use of intraoperative red blood cell salvage using centrifugation is indicated for blood conservation.
Use of a standardized hemostasis checklist during cardiac surgery, before closing, can reduce bleeding and blood transfusion.
Permissive Anemia in the Intraoperative and Postoperative Phases
A standardized, restrictive perioperative red blood cell transfusion protocol is favored in preference to a liberal strategy to reduce transfusion.
Goal-directed transfusion algorithms that incorporate point-of-care testing, such as with viscoelastic devices, are shown to reduce bleeding and transfusion.
Red blood cell transfusion is unlikely to benefit nonbleeding patients with a hemoglobin concentration >7.5 g/dL.

ERAS Cardiac Society turnkey order set for patient blood management: Proceedings from the AATS ERAS Conclave 2023

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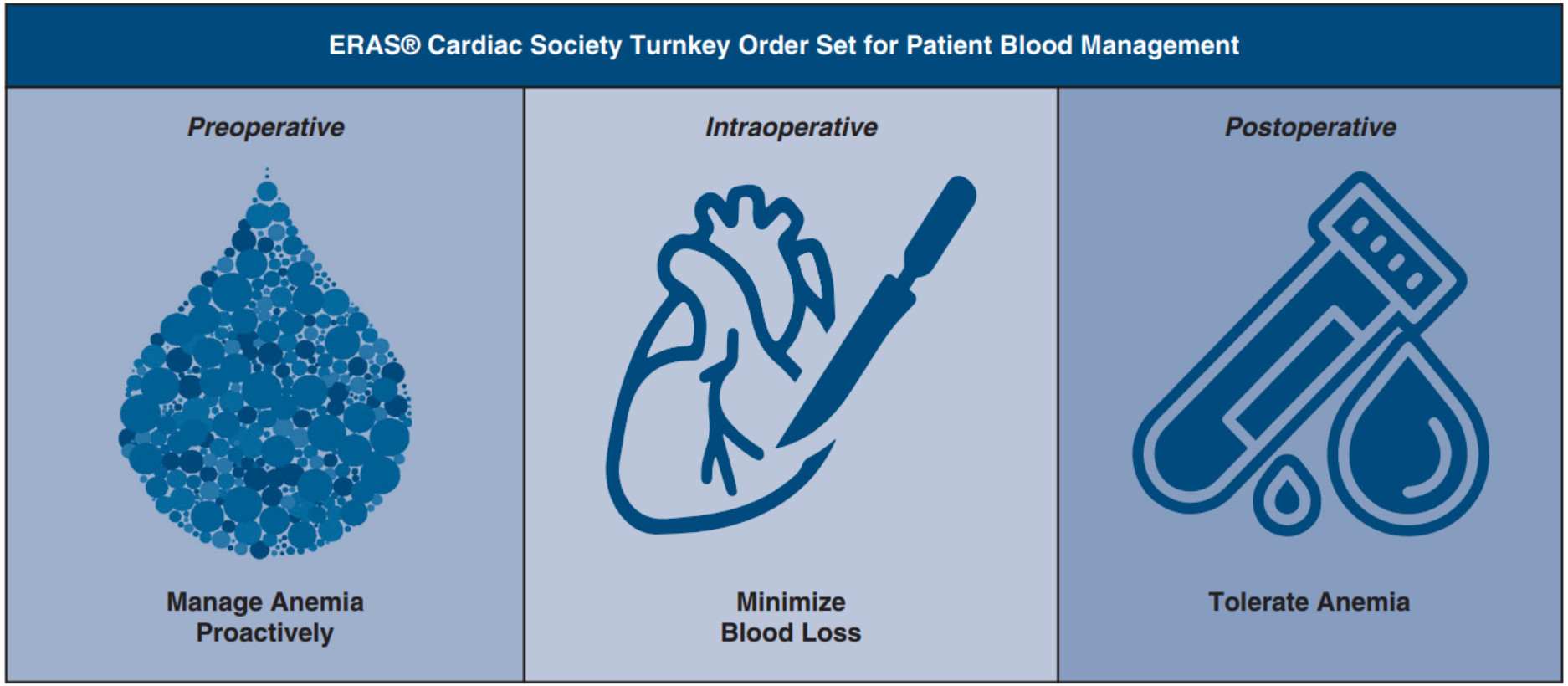
03 Patient blood management -Introduction

- Patient blood management is an essential quality component in contemporary cardiac surgery perioperative care.
- 3 main pillars



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03 Patient blood management -Preoperative recommendation

- Anemia evaluation & management

1. Screening and work up for preoperative anemia (Hb <13 g/dL)
   → lab test (CBC, PT/aPTT, TIBC, ferritin, occult blood test)
2. Iron replacement therapy
   for iron deficiency anemia, using IV iron if possible
   → Ferric gluconate 250mg IV once daily up to 7 days
   for nonanemic patient who are at higher risk of anemia and transfusion
   → Fe PO 325mg , 3 times /day
3. Treatment with ESA(Erythropoiesis stimulating agent) for most of anemic patients
   →Erythropoetin alfa-epo 40,000 IU IV x 1
4. Folic acid 5mg PO QD until surgery (up to 4 week)
5. Vitamin B-12 1000mcg PO QD until surgery (up to 4 week)

03 Patient blood management -Preoperative recommendation

- Discontinue medication

1. Send platelet aggregation study for patients receiving DAPT
2. Elective surgery, discontinue aspirin for 7 days & warfarin 5 days before surgery
3. For non emergent cases, discontinue Ticagrelor(Brillinta) at 3d, clopidogrel(Plavix) at 5d, prasugrel(Effient) at 7d before surgery
4. Patients on DOAC
   -non emergent case → discontinue apixaban(Eliquis) 3d, rivaroxaban(Xarelto) 4d, dabigatran(Pradaxa) 4d before surgery
   -emergent case → choose appropriate antidote
   : Andexanet alfa (for apixaban, rivaroxaban) 400mg IV bolus + 4mg/min for 2h (>8h last DOAC)
   800mg IV bolus + 8mg/min for 2h (<8h last DOAC)
   : Idarucizumab (for dabigatran) 5g IV bolus (PRAXbind)
5. patient with a.fib and high risk for CVA, bridge with IV heparin

03 Patient blood management -Intraoperative

❖ The primary focus of intraoperative recommendations is on **limiting blood loss**

Recommendation

1. Use cell salvage
2. Administration of antifibrinolytic agent (EACA, tranexamic acid)
   Ex) tranexamic acid bolus 10mg/kg IV + continuous IV 2mg/kg/h (Cr<1.6)
3. Visco-elastic testing (TEG) + treat coagulopathy according to standard protocol
4. Minimizing hemodilution from reducing priming volume & PRBC transfusion (over 6.0g/dL)

03 Patient blood management -Postoperative

❖ Following a standard transfusion protocol

-For Hb <7.5 g/dL, consider transfusion on active bleeding

-For INR >1.7, transfuse 2 unit of FFP

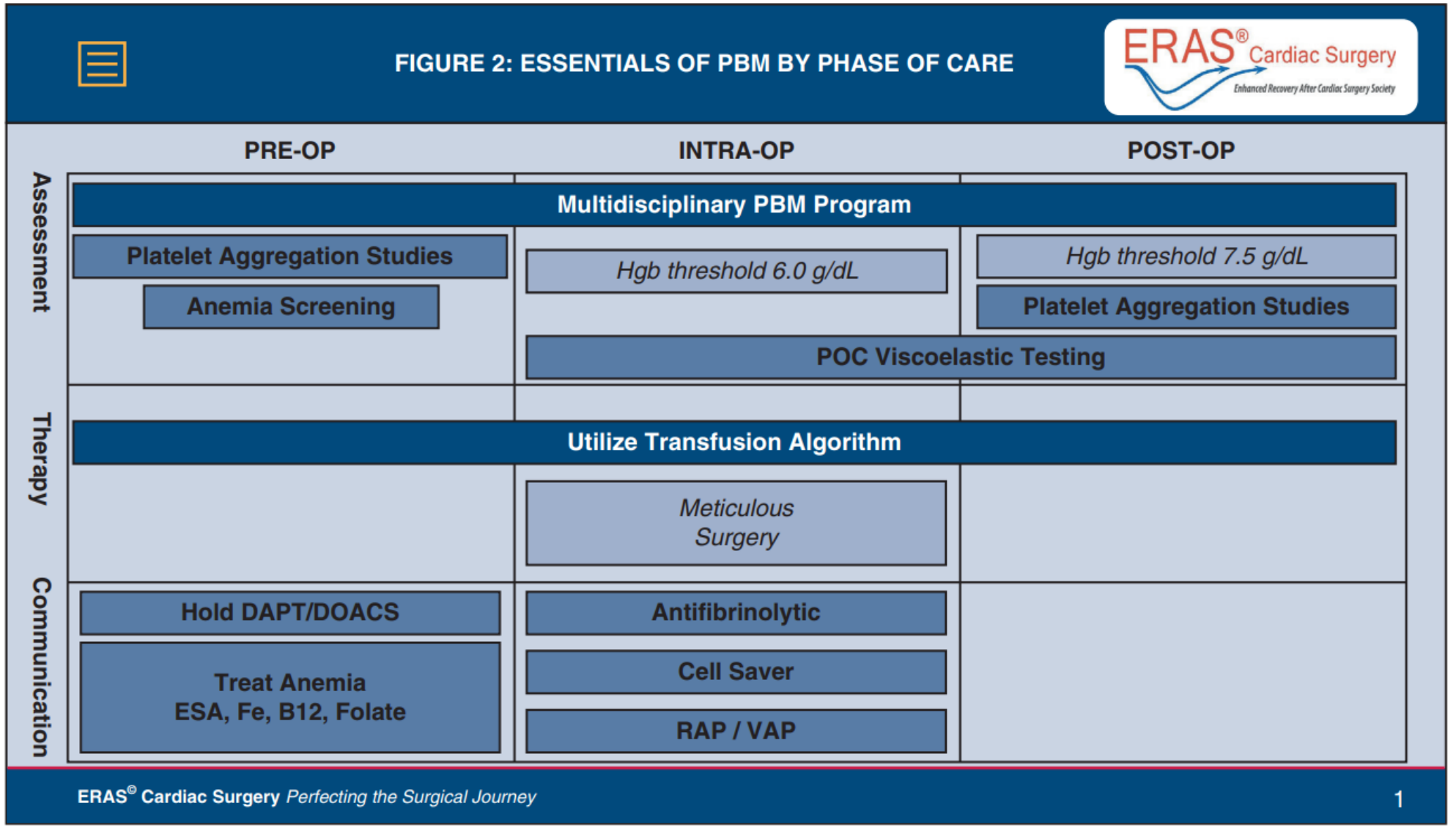
-For fibrinogen<150mg/dL, transfuse 10 U of cryoprecipitate

-For PLT < 50000, transfuse 2 U of PLT

-DDAVP 0.3g/kg IV x 1 for post CPB platelet dysfunction, uremia, or VWD

-For Hb <8.0 g/dL, ferric gluconate 250mg IV QD for 3 d or ferrous sulfate 324mg orally QD for 30 d

03 Patient blood management -Summary



감사합니다.

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