

PATIENT BLOOD MANAGEMENT



Erasmus+

1) PREOPERATIVE DATA

Demographic		
	Institution	
	Patient number	
	Age	
	Sex	Male/Female
	Height (cm)	
	Weight (kg)	
	Body mass index (kg/m ²)	
	Body surface area	
	First consultation date*	Day/month/year
* Examination date of preoperative preparations, date after surgery decision.		

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Laboratory Data		
	Hemoglobin	g/dL
	Hematocrit	%
	MCV	fl
	MCHC	g/dL
	Reticulocyte	%
	Thrombocyte count	$10^9/L$
	PT	sec
	aPTT	sec
	INR	
	Fibrinogen	mg/dL
	Blood group	A Rh (-), A Rh (+), B Rh (-), B Rh (+), AB Rh (-), AB Rh (+), 0 Rh (-), 0 Rh (+)
	AST	U/L
	ALT	U/L
	Total bilirubin	$\mu\text{mol/L}$
	Albumin	gr/L
	CRP	mg/L
	Creatinine	mg/dL
	Urea*	mg/dL
	Glomerular filtration rate**	$eGFR_{cr} = 142 \times \min(Scr/\kappa, 1)^\alpha \times \max(Scr/\kappa, 1)^{-1.200} \times 0.9938^{Age} \times 1.012$ [if female] mL/min/1.73 m ²
	Potassium	mmol/L
	Phosphorus	mmol/L
	Calcium	mmol/L
	Iron	$\mu\text{g/dL}$
	Ferritin	mg/L
	Iron binding capacity	$\mu\text{g/dL}$
	Transferrin saturation	% (Iron/total iron binding capacity*100)
	Folic acid	ng/mL
	Vitamin B12	pg/mL
	Fibrinogen	mg/dL

PT: Prothrombin time; aPTT: Activated partial thromboplastin time; INR: Internationalized normal ratio; AST: Aspartate transaminase; ALT: Alanine transaminase; CRP: C-reactive protein; * Blood Urea Nitrogen may be preferred. Automated calculation is possible; ** There are several equations for GFR estimate. CKD-epi 2021 calculation is added to this form. Automated calculation is possible.

$eGFR_{cr} = 142 \times \min(Scr/\kappa, 1)^\alpha \times \max(Scr/\kappa, 1)^{-1.200} \times 0.9938^{Age} \times 1.012$ [if female]

where:

Scr= standardized serum creatinine in mg/dL

κ = 0.7 (females) or 0.9 (males)

α = -0.241 (female) or -0.302 (male)

$\min(Scr/\kappa, 1)$ is the minimum of Scr/ κ or 1.0

$\max(Scr/\kappa, 1)$ is the maximum of Scr/ κ or 1.0

Medical History (Preoperative Risk Factors)		
	Hypertension requiring treatment	Yes/No
	Diabetes mellitus	Yes/No Treatment 1. Diet 2. Oral antidiabetics 3. Insulin
	LVEF	%
	Congestive heart failure	Yes/No
	NYHA Classification	NYHA I NYHA II NYHA III NYHA IV
	Hyperlipidemia	Yes/No
	Extra cardiac arteriopathy	Yes/No
	Neurological dysfunction	Yes/No
	CVA/TIAs	Yes/No
	Smoking	Yes/No 1. Never 2. Ex-smoker (>1 month) 3. Current smoker
	COPD	Yes/No
	Chronic kidney disease*	1. Stage 1: Kidney damage with normal or increased GFR (>90 mL/min/1.73 m ²) 2. Stage 2: Mild reduction in GFR (60-89 mL/min/1.73 m ²) 3. Stage 3a: Moderate reduction in GFR (45-59 mL/min/1.73 m ²) 4. Stage 3b: Moderate reduction in GFR (30-44 mL/min/1.73 m ²) 5. Stage 4: Severe reduction in GFR (15-29 mL/min/1.73 m ²) 6. Stage 5: Kidney failure (GFR <15 mL/min/1.73 m ² or dialysis)
	Hereditary coagulation disorders	1. Hemophilia A (Factor VIII deficiency) 2. Hemophilia B (Factor IX deficiency) 3. Von Willebrand disease 4. Other
	Thalassemia	Yes/No
	History of transfusion	Yes/No
	History of transfusion complication**	Yes/No
	EuroSCORE***	

LVEF: Left ventricular ejection fraction; NYHA: New York Heart Association; CVA: Cerebro vascular accident; TIAs: Transient ischemic attacks; COPD: Chronic obstructive pulmonary disease.

* The Kidney Disease Outcomes Quality Initiative (KDOQI) of the National Kidney Foundation (NKF) classification. Automated selection is possible

** Any complication related to transfusion

*** EuroSCORE or STS score can be preferred according to institution.

Preoperative Medication		
	ASA	Yes/No
	P2Y12 inhibitors	Yes/No/Stopped prior to surgery* 1. Ticagrelor 2. Clopidogrel 3. Prasugrel 4. Ticlopidin
	Using warren	Yes/No/Stopped prior to surgery* INR <2 before surgery Yes/No
	DOAC	Yes/No/Stopped prior to surgery* 1. Dabigatran 2. Rivaroxaban 3. Apixaban 4. Edoxaban
	LMWH	Yes/No/ Stopped prior to surgery*
	Andexanat alfa	Yes/No
	Idarucizumab	Yes/No
ASA: American Society of Anesthesiologists; DOAC: Directly acting oral anticoagulants; LMWH: Low-molecular-weight heparin. *This defines recommended duration of drug cessation before surgery or more. Ex. 3≤ days for ticagrelor 5≤ days for clopidogrel		

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2) RISK FACTORS

Evaluation of Bleeding Risk		
The Papworth Bleeding Risk Stratification Score	Value 0	Value 1
Surgery priority	Elective	Urgent or emergency
Surgery type	CABG or single valve	All other surgery types
Aortic valve disease	None	Stenosis, regurgitation or both
BMI (kg/m ²)	BMI ≥25	<25
Age (year)	<75	≤75
CABG: Coronary artery bypass graft; BMI: Body mass index.		

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Evaluation of Transfusion Risk		
	Transfusion Risk (ACTA-Port)	Point
Age (year)	>70 ≤70	1 0
Sex	Female Male	1 0
Hb (g/dL)	• <11 • 11 • 12 • 13 • 14 • ≤15	9 8 6 3 2 0
Type of operation	• CABG/valve • Combination • Other	2 5 0
EuroSCORE II	• <1 • 1 • 2 • 3 • ≤9	0 2 3 4 5
Creatinine (μmol/L)	• <88 • 88 • 177	0 1 3
BSA (m ²)	• <1.7 • 1.7 • 1,9 • 2,1 • ≤2.3	6 4 2 1 0
Total		0-30
Estimated risk of perioperative blood transfusion*		
Median units of blood transfused according to score**	• 0-14 • 15-19 • 20-24 • 25-30	0 Unit 1 Unit 2 Unit 3 Unit
CABG: Coronary artery bypass graft. * Automated Risk Calculation is possible ** The score was not designed to predict number of units of blood transfused. However, increasing ACTA-PORT score was associated with increased number of units of blood transfused perioperatively: risk score 0-14, median units of blood transfused 0; score 15-19, median 1 unit; score 20-24, median 2 units; and score 25-30, median 3 units.		

Preoperative Evaluation		
Operation date		Day/month/year
Duration between 1 st examination and surgery		Days
Preoperative Laboratory Results		
1	Hemoglobin	g/dL
2	Hematocrit	%
3	MCV	fl
4	MCHC	g/dL
5	Reticulocyte	%
6	Thrombocyte count	10 ⁹ /L
7	PT	sec
8	aPTT	sec
9	INR	
10	Fibrinogen	mg/dL
11	Blood group	A Rh(-), A Rh(+), B Rh(+), B Rh(+), AB Rh(-), AB Rh(+), 0 Rh(-), 0 Rh(+)
12	AST	U/L
13	ALT	U/L
14	Total bilirubin	μmol/L
15	Albumin	g/L
16	CRP	mg/L
17	Creatinine	mg/dL
18	Urea	mg/dL
19	Glomerular filtration rate	$eGFR_{Cr} = 142 \times \min(Scr/\kappa, 1)^\alpha \times \max(Scr/\kappa, 1)^{-1.200} \times 0.9938^{Age} \times 1.012$ [if female] mL/min/1.73 m ²
20	Potassium	mmol/L
21	Phosphorus	mmol/L
22	Calcium	mmol/L
23	Iron	μg/dL
24	Ferritin	mg/L
25	Iron binding capacity	μg/dL
26	Transferrin saturation	%
27	Folic acid	ng/mL
28	Vitamin B12	pg/mL
29	Fibrinogen	mg/dL
PT: Prothrombin time; aPTT: Activated partial thromboplastin time; AST: Aspartate transaminase; ALT: Alanine transaminase; CRP: C-reactive protein.		

Anemia/Iron Deficiency Treatment		
	Preoperative iron supplementation	Yes/No 1. IV • Ferric carboxymaltose • Iron sucrose 2. Oral
	Dose of IV iron supplementation	mg
	Preoperative folic acid supplementation	Yes/No
	Postoperative folic acid supplementation	Yes/No
	Duration between surgery and IV iron supplementation	Days
	Erythropoietin	Yes/No
	Preoperative blood transfusion	Yes/NoUnits

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3) OPERATIVE DATA

Autologous blood donation*	Yes/NoUnits
Acute normovolemic hemodilution	Yes/NomL
Antifibrinolytic	Yes/No
Type of fibrinolytic**	1. Aprotinin 2. TxA 3. EACA low dose 4. Medium dose 5. High dose bolus and maintenance 6. Postoperative bolus
Antegrade or retrograde autologous priming	Yes/No
Amount of AAP/RAP	mL
Ultrafiltration	Yes/NomL
Anticoagulation type	1. Heparin 2. Bivaluridin
Heparin dosage (initial bolus)	1. 150 U/kg 2. 300 U/kg 3. 400 U/kg
Total heparin (bolus+prime+maintenance)	Units
Antithrombin III concentrate replacement to increase ACT	Yes/No
FFP replacement to increase ACT	Yes/NoUnits
Protamine	Units
Protamine/heparin ratio	Automated calculation
Type of operation	1. CABG 2. Valve 3. Combination 4. Aort
Redo case	Yes/No
Timing of surgery	1. Elective 2. Urgent 3. Emergency 4. Salvage
Off-pump surgery	Yes/No
Prime volume	mL
Residual prime***	mL
CPB time	sec
Cross clamp time	sec
Minimum temperature	°C

Type of cardioplegia	1. Blood 2. Crystalloid 3. Histidine-tryptophan-ketoglutarate (HTK) 4. Del Nido
Route of cardioplegia	1. Antegrade 2. Retrograde 3. Antegrade + retrograde
Amount of cardioplegia	mL
MIECC	Yes/No
Cell saver? Amount of transfusion	Yes/NomL
Circulatory arrest	Yes/No 1. Circulatory arrest 2. Retrograde perfusion 3. Antegrade selective cerebral perfusion Hypothermia during arrest Yes/No 1. Moderate 2. Deep
RBC transfusion during CPB	
Topical hemostatic agent usage	Yes/NoUnits
Topical hemostatic agent usage	Yes/No
TxA: Tranexamic acid; EACA: Epsilon-aminocaproic acid; FFP: Fresh frozen plasma; ACT: Active coagulation time; CABG: Coronary artery bypass graft; CPB: Cardiopulmonary bypass; MIECC: Minimal invasive extracorporeal circulation; RBC: Red blood cell. * Autologous donations (self donation) are blood donations that patient give for their own use. ** Transamine dosage varies between clinics researchers can modify this section. *** Prime volume-AAP/RAP volume.	

4) POSTOPERATIVE DATA

Postoperative Early Period ICU Follow-up	
Total drainage in 12 hours	mL
Hemorrhage more than 1000 mL	Yes/No
Tamponade	Yes/No
Cardiac arrest related to hemorrhage	Yes/No
Reexploration due to hemorrhage	Yes/No
Location of reexploration	1. ICU 2. Operating room
Timing of reexploration	1. ≤6 hours 2. 6-12 hours 3. 12< hours
Possible cause of hemorrhage	1. Surgical 2. Coagulopathy
If coagulopathy is considered treatment is guided with viscoelastic tests (VET)?	Yes/No
Which VET is performed?	1. TEG 2. ROTEM
Threshold Hb or RBC transfusion	1. <7 g/dL 2. <8 g/dL 3. <10 g/dL
Total RBC transfused (Perioperative all transfusions)	Units
Total FFP transfused	Units
Total cryoprecipitate transfused	Units
Total thrombocyte transfused	Units
DIC	No Hemorrhage developed Thrombosis developed
Fibrinogen replacement	Yes/Nounits
PCC replacement	Yes/Nounits
Factor 13 replacement	Yes/No
Recombinant Factor 7a replacement	Yes/No
Desmopressin	Yes/No
ICU: Intensive care unit; TEG: Thromboelastography; ROTEM: Rotational thromboelastometry; RBC: Red blood cell; FFP: Fresh frozen plasma; DIC: Disseminated intravascular coagulation.	

Transfusion Related Complications	
Acute hemolytic	Yes/No
Late hemolytic	Yes/No
Transfusion related acute lung injury (TRALI)	Yes/No
Transfusion associated dyspnea (TAD)	Yes/No
Transfusion associated circulatory overload (TACO)	Yes/No
Acute urticaria	Yes/No
Anaphylaxis/anaphylatoid reaction	Yes/No
Post transfusion purpura	Yes/No
Nonhemolytic febrile transfusion reaction (NHFTR)	Yes/No
Transfusion associated graft versus host disease	Yes/No
Embolism	Yes/No
Sepsis	Yes/No
Transfusion transmitted diseases	Yes/No

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Postoperative Late Follow-up	
Arrhythmia	None AV block New onset AF Atrial flutter SVT VT VF
Postoperative highest creatinine	mg/dL
Acute kidney injury	Stage 1 Stage 2 Stage 3
Dialysis	Yes/No
Mechanic ventilation duration	hours
Entubation longer than 24 hours	Yes/No
Pulmonary complications	None Atelectasis Pneumonia ARDS Pulmonary effusion Pulmonary edema
NIMV	Yes/No
Reintubation	Yes/No
Surgical wound infection until discharge	None Superficial infection Deep infection
Surgical wound infection after discharge	None Superficial infection Deep infection
Sternal dehiscence detected until discharge	Yes/No
Mediastinitis	Yes/No
Cerebrovascular event	Yes/No
Type of CVA? 1. Hemorrhagic 2. Ischemic 3. Hypoxic sequela 4. Sequela	Yes No
Seizure	Yes/No
Gastrointestinal complication	Yes/No
Septicemia proven with positive blood cultures	Yes/No
Septic shock	Yes/No
Type 5 MI	Yes/No
Cardiac arrest not related with hemorrhage	Yes/No
NIMV: Non invasive mechanic ventilation; CVA: Cerebrovascular accident; MI: Myocardial infaction.	