

### 說明18

術前貧血狀態下進行心臟手術與相關風險，包括死亡率、併發症發生率等探討文獻舉例如下表：

Reference	Definition	Main outcome
Karkouti K et al. Risk associated with preoperative anemia in cardiac surgery: a multi-center cohort study. <i>Circulation</i> 2008;117(4):478-484.	Preoperative hemoglobin concentration <12.5 g/dL	Preoperative anemia is independently associated with adverse outcomes, including in-hospital death, stroke, or acute kidney injury after cardiac surgery.
Van Straten AHM et al. Preoperative hemoglobin level as predictor of survival after coronary artery bypass grafting: a comparison with the matched population. <i>Circulation</i> 2009;120(2):118-125.	Preoperative hemoglobin <13 g/dL for men and <12 g/dL for women.	A lower preoperative hemoglobin level is an independent predictor of late mortality in patients undergoing CABG, whereas anemia is a risk factor for early and late mortality.
Cladellas M et al. Is preoperative anemia a risk marker for in-hospital mortality and morbidity after valve replacement? <i>Eur Heart J</i> 2006;27(9):1093-1099.	Preoperative hemoglobin concentration <12 g/dL	In patients undergoing elective valve replacement pre-operative HB <12 g/dL is a risk marker of in-hospital mortality and serious adverse outcomes, such as in-hospital mortality and morbidities such as heart failure, myocardial infraction, reoperation, neurological complication, acute kidney failure, and reoperation for bleeding.
Ranucci M et al. Impact of preoperative anemia on outcomes in adult cardiac surgery: a propensity-	Preoperative hematocrit <30%	Moderate-to-severe preoperative anemia is a risk factor for major morbidity, defined in

<p>matched analysis. Ann Thorac Surg 2012;94(4):1134-1142.</p>		<p>presence of at least one of the following conditions: surgical revision, mechanical ventilation greater than 48 hours, stroke, acute kidney injury, and bloodstream infection, and operative mortality in adult cardiac operations.</p>
<p>Karkouti K et al. Interrelationship of preoperative anemia, intraoperative anemia, and red blood cell transfusion as potentially modifiable risk factors for acute kidney injury in cardiac surgery: a historical multicentre cohort study. Can J Anaesth 2015;62(4):377-384.</p>	<p>1. Preoperative anemia hemoglobin &lt;13 g/dL in males and &lt;12 g/dL in females 2. Intraoperative anemia: hemoglobin &lt;8 g/dL during CPB.</p>	<p>Preoperative anemia, intraoperative anemia, and RBC transfusion on the day of surgery are interrelated risk factors for AKI after cardiac surgery.</p>
<p>Miceli A et al. Preoperative anemia increases mortality and postoperative morbidity after cardiac surgery. J Cardiothorac Surg 2014;9:137.</p>	<p>Preoperative anemia hemoglobin &lt;13 g/dL in males and &lt;12 g/dL in females</p>	<p>Preoperative anemia is associated with an increased risk of mortality and postoperative morbidity</p>

## 說明 19

### Erythropoietin (EPO)

#### 1. 代表藥物：EPREX injection 10,000 IU/mL

健保適應症：

- (1) 治療與慢性腎臟功能失調有關的貧血症狀或因此而需要輸血之患者。
- (2) 治療與癌症化學治療有關的症狀性貧血。

#### 2. 代表藥物：Recormon solution for injection in pre-filled syringe 5,000IU

健保適應症：

- (1) 治療慢性腎衰竭且伴隨症狀性貧血病人。

- (2) 治療與癌症化學治療有關的症狀性貧血。
- (3) 治療正在接受腫瘤治療之多發性骨髓瘤 (Multiple myeloma)、低度非何杰金氏淋巴瘤 (Low grade non-Hodgkin's lymphoma) 或慢性淋巴性白血病 (Chronic lymphocytic leukemia) 成人患者的症狀性貧血。

3. 代表藥物：NESP Injection plastic syringe 180 µg/0.5 mL

健保適應症：

- (1) 治療與慢性腎臟功能失調有關的貧血症狀或因此而需要輸血的患者。
- (2) 治療與癌症化學治療有關的症狀性貧血。

4. 代表藥物：Mircera solution for injection in pre-filled syringe 75 µg/0.3 mL

健保適應症：

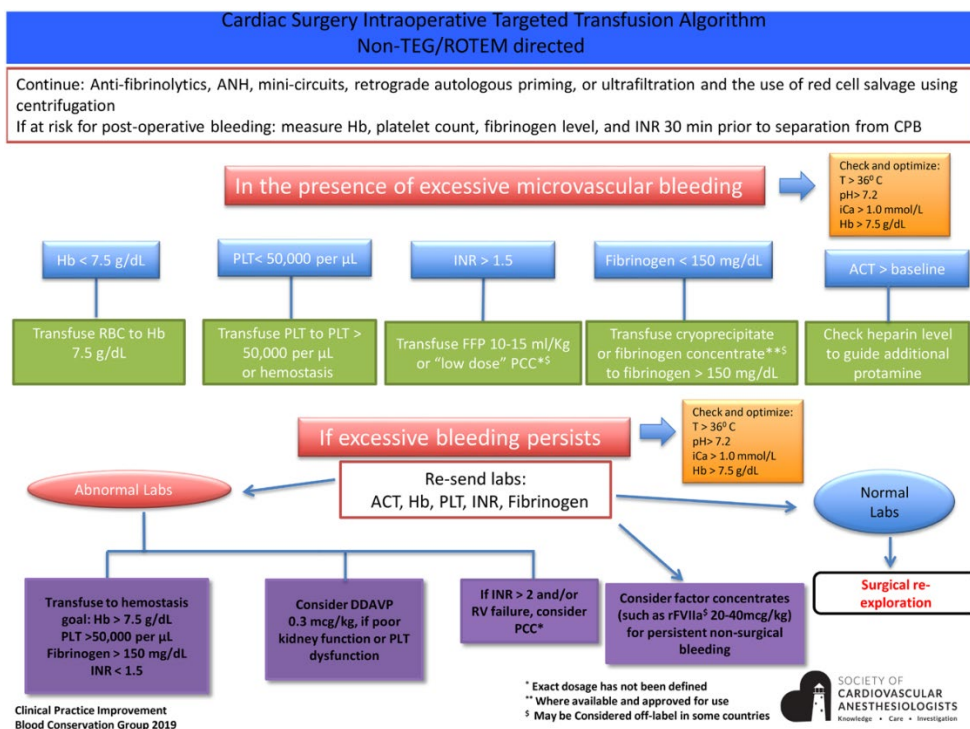
- (1) 治療慢性腎病所引起的症狀性貧血。
- (2) Mircera 尚未核准於治療因癌症化學療法引起的貧血。

說明 20

ACTA-PORT 線上計分網址：

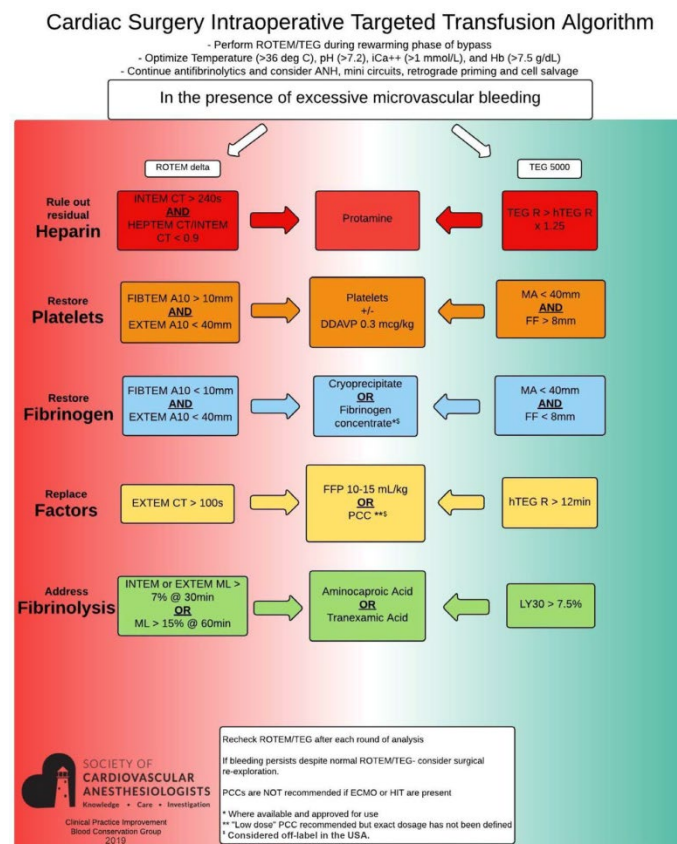
[https://qxmd.com/calculate/calculator\\_436/PORT-score-for-PeriOperative-Risk-of-blood-Transfusion-in-cardiac-surgery-by-ACTA](https://qxmd.com/calculate/calculator_436/PORT-score-for-PeriOperative-Risk-of-blood-Transfusion-in-cardiac-surgery-by-ACTA)

說明 21



## 說明 22

心臟手術術中使用血栓彈力圖（Thromboelastography；TEG）/旋轉血栓彈力儀（Rotational thromboelastometry；ROTEM）之輸血建議流程



## 說明 23

建議部門建立起以 Viscoelastic hemostatic assay（VHA）檢驗為依據的止血方針，即包含血栓彈力圖（Thromboelastography；TEG）、旋轉血栓彈力儀（Rotational thromboelastometry；ROTEM）等仍評估綜合性凝血問題的檢驗方式，相較於傳統的 Coagulation parameters（Prothrombin time〔PT〕、activated Partial thromboplastin time〔aPTT〕、Thrombin time〔TT〕、Fibrinogen、D-dimer），TEG 對於凝血異常的偵測有顯著的改善。特別在複雜的心臟手術當中，利用 TEG 或 ROTEM 床邊檢驗，來引導輸血行為有助於減少輸血的需求。據 ROTEM/TEG 檢驗顯示可提供臨床有關於冷凍沈澱品（Cryoprecipitate）、冷凍新鮮血漿（Fresh frozen plasma；FFP）、血小板（Platelets）、凝血因子濃縮物等之使用建議，然因 ROTEM/TEG 雖歐美一些國家與中國已廣被使用，但在台灣因仍未列健保給付項目，目前實際使用狀況仍有限。