

ESC/ESA Guidelines on non-cardiac surgery cardiovascular assessment and management



Perioperative monitoring

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ECG monitoring

*Continuous ECG monitoring is recommended for all patients undergoing anaesthesia.

*V5 has for many years been regarded as the best choice for the detection of intra-operative ischaemia.

*the best sensitivity was obtained with V5 (75%), followed by V4 (61%), combining leads V4 and V5 increased the sensitivity to 90%. When the leads II, V4 and V5 were used simultaneously, the sensitivity was greater than 95% .

*12-lead ECG monitoring is recommended especially in high-risk patients, although correct positioning of 12 leads is not feasible in high abdominal and thoracic surgery .

ECG Monitoring

Recommendations on ECG monitoring

Recommendations	Class ^a	Level ^b	Ref. ^c
Peri-operative ECG monitoring is recommended for all patients undergoing surgery.	I	C	
Selected lead combinations should be considered for better detection of ischaemia in the operating room.	IIa	B	225, 226
When feasible, twelve-lead ECG monitoring should be considered for high-risk patients undergoing surgery.	IIa	B	227, 228

Transoesophageal echocardiography

*Transoesophageal echocardiography (TOE) has frequently been used as a monitoring tool during cardiac surgery.

*Myocardial ischaemia can be identified by abnormalities in regional wall motion and thickening.

*TOE is recommended if acute and severe haemodynamic instability occurred.

*It is useful for determining the cause of severe hypotension, hypovolaemia, low ejection fraction, severe embolism, myocardial ischaemia, cardiac tamponade.

Transoesophageal echocardiography

Recommendations on intra-operative and/or perioperative TOE for detection of myocardial ischaemia

Recommendations	Class ^a	Level ^b
The use of TOE should be considered in patients who develop ST-segment changes on intra-operative or peri-operative ECG monitoring.	IIa	C
The use of TOE may be considered in patients at high risk of developing myocardial ischaemia, who undergo high-risk non-cardiac surgery.	IIb	C

Transoesophageal echocardiography

Recommendations on intra-operative and/or perioperative TOE in patients with or at risk of haemodynamic instability

Recommendations	Class ^a	Level ^b
TOE is recommended when acute sustained severe haemodynamic disturbances develop during surgery or in the peri-operative period.	I	C
TOE monitoring may be considered in patients at increased risk of significant haemodynamic disturbances during and after high-risk non-cardiac surgery.	IIb	C
TOE monitoring may be considered in patients who present severe valvular lesions during high-risk non-cardiac surgery procedures accompanied by significant haemodynamic stresses.	IIb	C

Blood Glucose Control

*Diabetes mellitus is the most common metabolic disorder in Europe.

*Type 2 diabetes accounts for .90% of cases, and is expected to increase, probably due to the obesity epidemic in children and young adults.

*According to the World Health Organization, approximately 50% of patients with type 2 diabetes die of CVD.

*Elevated levels of glycosylated haemoglobin (HbA1c) are associated with worse outcomes in surgical and critical care patients.

Blood Glucose Control

*Subsequent studies, however, found a reduction in mortality in those whose blood glucose control was less strict [7.8–10 mmol/L (140–180 mg/dL)] than in those in whom it was tightly controlled [4.5–6 mmol/L (81–108 mg/dL)], as well as fewer incidents of severe hypoglycaemia.

*Subsequent meta-analyses have demonstrated no reduction in 90-day mortality with intensive blood glucose control but a five- to six-fold incidence of hypoglycaemia.

Blood glucose control

Recommendations on blood glucose control

Recommendations	Class ^a	Level ^b
Post-operative prevention of hyperglycaemia [targeting levels at least <10.0 mmol/L (180 mg/dL)] by intravenous insulin therapy is recommended in adults after high-risk surgery that requires admission to the intensive care unit.	I	B
In patients at high surgical risk, clinicians should consider screening for elevated HbA _{1c} before major surgery and improving pre-operative glucose control.	IIa	C
Intra-operative prevention of hyperglycaemia with insulin may be considered.	IIb	C
Post-operative targets <6.1 mmol/L (110 mg/dL) are not recommended.	III	A



- **Thank you**

