

# ESA Hemodynamic Monitoring Questionnaire

## 1. Hemodynamic Management in Patients Undergoing High Risk Surgery

For the following questionnaire, we will define high risk surgery patients as patients aged 18 years or older presenting for major surgery expected to last more than 1.5 hours and having at least two of the following criteria:

1. Cardiac or respiratory illness resulting in functional limitation
2. Extensive surgery planned for carcinoma involving bowel anastomosis
3. Predictable acute massive blood loss (>2.5 litres)
4. Aged over 70 years with functional limitation of one or more organ systems
5. Septicemia (positive blood cultures or septic focus)
6. Respiratory failure (PaO<sub>2</sub> < 8 kPa on FiO<sub>2</sub> >0.4 i.e. PaO<sub>2</sub>:FiO<sub>2</sub> ratio < 20 kPa or ventilation >48hours)
7. Acute abdominal catastrophe (e.g. pancreatitis, perforated viscus, gastro-intestinal bleed)
8. Acute renal failure (urea >20 mmol l<sup>-1</sup>, creatinine >260 μ mol l<sup>-1</sup>)
9. Surgery for abdominal aortic aneurysm
10. Disseminated malignancy

**1. If you do not provide or directly supervise anesthesia for this type of patient, please indicate so by filling in the box below. Thank you.**

I do not provide or directly supervise anesthesia for this type of patient.

I provide or directly supervise anesthesia for this type of patient.

## 2. Hemodynamic Management in Patients Undergoing High Risk Surgery

**2. How many times in a typical work week do you provide or directly supervise anesthesia for a high risk surgery patient?**

Rarely or Never

1 to 5 times a week

6 to 10 times a week

More than 11 times a week

## 3. Hemodynamic Management in Patients Undergoing High Risk Surgery

**3. Which statement best describes your practice setting?**

University Hospital

General Hospital

Private Practice

Other

Other (please specify)

## 4. Hemodynamic Management in Patients Undergoing High Risk Surgery

## ESA Hemodynamic Monitoring Questionnaire

**4. Does your institution or group have a written protocol, care guide, or statement concerning hemodynamic management in this setting?**

Yes

No

Unsure or don't know

## 5. Hemodynamic Management in Patients Undergoing High Risk Surgery

**5. What hemodynamic monitoring do you routinely use for the management of high risk surgery patients? (please, mark all that apply)**

- Central venous pressure
- Cardiac output
- Pulmonary capillary wedge pressure
- Central venous saturation (SvO<sub>2</sub>)
- Stroke Volume Variation
- Systolic Pressure Variation
- Pulse Pressure Variation
- Mixed venous saturation (ScvO<sub>2</sub>)
- Non-invasive arterial pressure
- Transesophageal echocardiography
- Global end diastolic volume
- Near infrared spectroscopy
- Oxygen delivery (DO<sub>2</sub>)
- Plethysmographic Waveform Variation
- Invasive arterial pressure

## 6. Hemodynamic Management in Patients Undergoing High Risk Surgery

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### 6. How frequently do you try to optimize arterial pressure intraoperatively in this setting?

- Never
- Less than 5 percent of the time
- Between 6 and 25 percent of the time
- Between 26 and 50 percent of the time
- Between 51 and 75 percent of the time
- More than 75 percent of the time

## 7. Hemodynamic Management in Patients Undergoing High Risk Surgery

### 7. How frequently do you try to optimize central venous pressure in this setting?

- Never
- Less than 5 percent of the time
- Between 6 and 25 percent of the time
- Between 26 and 50 percent of the time
- Between 51 and 75 percent of the time
- More than 75 percent of the time

## 8. Hemodynamic Management in Patients Undergoing High Risk Surgery

### 8. How frequently do you try to optimize cardiac output in this setting?

- Never
- Less than 5 percent of the time
- Between 6 and 25 percent of the time
- Between 26 and 50 percent of the time
- Between 51 and 75 percent of the time
- More than 75 percent of the time

## 9. Hemodynamic Management in Patients Undergoing High Risk Surgery

## ESA Hemodynamic Monitoring Questionnaire

**9. How frequently do you try to optimize central venous oxygen saturation (SvO<sub>2</sub>) in this setting?**

- Never
- Less than 5 percent of the time
- Between 6 and 25 percent of the time
- Between 26 and 50 percent of the time
- Between 51 and 75 percent of the time
- More than 75 percent of the time

## 10. Hemodynamic Management in Patients Undergoing High Risk Surgery

**10. How frequently do you try to optimize mixed venous oxygen saturation (ScVO<sub>2</sub>) in this setting?**

- Never
- Less than 5 percent of the time
- Between 6 and 25 percent of the time
- Between 26 and 50 percent of the time
- Between 51 and 75 percent of the time
- More than 75 percent of the time

## 11. Hemodynamic Management in Patients Undergoing High Risk Surgery

**11. How frequently do you try to optimize dynamic parameters of fluid responsiveness (Pulse Pressure Variations, Systolic Pressure Variations, Plethysmographic Waveform Variations) in this setting?**

- Never
- Less than 5 percent of the time
- Between 6 and 25 percent of the time
- Between 26 and 50 percent of the time
- Between 51 and 75 percent of the time
- More than 75 percent of the time

## 12. Hemodynamic Management in Patients Undergoing High Risk Surgery

## ESA Hemodynamic Monitoring Questionnaire

**12. If you optimize hemodynamics in your high risk surgery patients, when do you do it?**

- 1. Before anesthesia induction
- 2. After anesthesia induction
- 3. During surgery
- 4. In the postoperative period

## 13. Hemodynamic Management in Patients Undergoing High Risk Surgery

**13. When do you think that hemodynamic optimization is of most value?**

- 1. Before anesthesia induction
- 2. After anesthesia induction
- 3. During surgery
- 4. In the postoperative period

## 14. Hemodynamic Management in Patients Undergoing High Risk Surgery

**14. Regarding respiratory variations in arterial pulse and/or systolic pressure: how do you measure these indices in the clinical setting?**

- 1. Eyeballing
- 2. Manual calculation
- 3. Automatic measurement using specific software

If you use automatic measurement using a dedicated software, please specify which one.

## 15. Hemodynamic Management in Patients Undergoing High Risk Surgery

## ESA Hemodynamic Monitoring Questionnaire

### 15. What technique do you use to monitor cardiac output? (please, mark all that apply)

- Swan Ganz catheter
- LiDCO Monitor
- PiCCO Monitor
- Transesophageal echocardiography
- Thoracic bioimpedance
- Other
- Esophageal Doppler
- Vigileo Monitor

Other (please specify)

### 16. Hemodynamic Management in Patients Undergoing High Risk Surgery

#### 16. If you do not monitor cardiac output routinely in these patients, what are the main reasons for not monitoring it? (please, mark all that apply)

- Cardiac output monitoring does not provide any additional clinically relevant information in this setting
- I use SvO<sub>2</sub> and/or ScVO<sub>2</sub> as surrogates for cardiac output monitoring
- I use dynamic parameters of fluid responsiveness (Pulse Pressure Variations, Systolic Pressure Variations, Plethysmographic Waveform Variations) as surrogates for cardiac output monitoring
- Available cardiac output monitoring solutions are unreliable
- Available cardiac output monitoring solutions are too invasive

### 17. Hemodynamic Management in Patients Undergoing High Risk Surgery

Reminder:

In this questionnaire we define high risk surgery patients as patients aged 18 years or older presenting for major surgery expected to last more than one and a half hours and presenting at least two of the following criteria:

1. Severe cardiac or respiratory illness resulting in severe functional limitation
2. Extensive surgery planned for carcinoma involving bowel anastomosis
3. Predictable acute massive blood loss (>2.5 litres)
4. Aged over 70 years with functional limitation of one or more organ systems
5. Septicaemia (positive blood cultures or septic focus)
6. Respiratory failure (PaO<sub>2</sub> < 8 kPa on FiO<sub>2</sub> >0.4 i.e. PaO<sub>2</sub>:FiO<sub>2</sub> ratio < 20 kPa or ventilation >48hours)
7. Acute abdominal catastrophe (e.g. pancreatitis, perforated viscous, gastro-intestinal bleed)
8. Acute renal failure (urea >20 mmol l<sup>-1</sup>, creatinine >260 µ mol l<sup>-1</sup>)
9. Surgery for abdominal aortic aneurysm
10. Disseminated malignancy

## ESA Hemodynamic Monitoring Questionnaire

### 17. What are your indicators for volume expansion in this setting (diagnostic tools)? (please, mark all that apply)

- Clinical experience
- Stroke Volume Variation
- Cardiac output
- Pulse Pressure Variation or Systolic Pressure Variation
- Urine output
- Pulmonary capillary wedge pressure
- Plethysmographic Waveform Variation
- Central venous pressure
- Central venous saturation (SvO2)
- Blood pressure
- Mixed venous saturation (ScvO2)
- Global end diastolic volume
- Transesophageal echocardiography

## 18. Hemodynamic Management in Patients Undergoing High Risk Surgery

### 18. How do you routinely assess the hemodynamic effects of volume expansion in this setting?

- Decrease in stroke volume variation
- Increase in cardiac output
- Decrease in plethysmographic waveform variation
- Increase in central venous saturation (SvO2)
- Decrease in pulse pressure variation or systolic pressure variation
- Decrease in heart rate
- Increase in urine output
- Increase in blood pressure
- Increase in mixed venous saturation (SvO2)

## 19. Hemodynamic Management in Patients Undergoing High Risk Surgery

## ESA Hemodynamic Monitoring Questionnaire

**19. In your opinion, what best predicts an increase in cardiac output following volume expansion?**

- Blood pressure
- Pulse pressure variation or systolic pressure variation
- Central venous pressure
- Pulmonary capillary wedge pressure
- Mixed venous saturation (ScvO2)
- Stroke volume variation
- Central venous saturation (SvO2)
- Plethysmographic waveform variations
- Transesophageal echocardiography
- Global end diastolic volume
- Clinical experience
- Cardiac output

## 20. Hemodynamic Management in Patients Undergoing High Risk Surgery

**20. What is your first choice solution for volume expansion?**

- Hydroxyethylstarch solutions
- Blood derived products
- Human albumin
- Crystalloids
- Dextrans
- Gelatin

## 21. Hemodynamic Management in Patients Undergoing High Risk Surgery

**21. Do you or your department/group manage these patients in the intensive care unit?**

- Yes
- No

## 22. Hemodynamic Management in Patients Undergoing High Risk Surgery



## ESA Hemodynamic Monitoring Questionnaire

### 22. If not, who manages these patients in the ICU?

- Critical Care physicians
- Surgeons
- Other anesthesiologists
- Other physicians than anesthesiologists or surgeons
- Mixed population

### 23. Hemodynamic Management in Patients Undergoing High Risk Surgery

#### 23. Do you believe that oxygen delivery to the tissues is of major importance in patients during high risk surgery?

- Yes
- No

### 24. Hemodynamic Management in Patients Undergoing High Risk Surgery

#### 24. What parameter(s) is (are) involved in oxygen delivery to the tissues?

- PaO<sub>2</sub>
- SaO<sub>2</sub>
- Central venous pressure
- Cardiac Output
- Hemoglobin
- Arterial Pressure

### 25. Hemodynamic Management in Patients Undergoing High Risk Surgery

#### 25. Do you believe that your current hemodynamic management could be improved?

- Yes
- No

### 26. Hemodynamic Management in Patients Undergoing High Risk Surgery

# ESA Hemodynamic Monitoring Questionnaire

## 26. Which statement best describes you?

- I am an anesthesiologist predominantly caring for transplant surgery patients
- I am an anesthesiologist predominantly caring for cardiac surgery patients
- I am an anesthesiologist predominantly caring for patients not having transplant or cardiac surgery
- I am an anesthesiologist predominantly practicing intensive care
- I am an anesthesiologist caring for a variety of patients
- Other

Other (please specify)

## 27. Hemodynamic Management in Patients Undergoing High Risk Surgery

### 27. Did your training include a fellowship year?

- Yes
- No
- Not applicable

## 28. Hemodynamic Management in Patients Undergoing High Risk Surgery

### 28. If yes, which one(s)?

- Critical care medicine
- Pediatric anesthesiology
- Pain
- Research
- Cardiac anesthesiology
- Other

Other (please specify)

## 29. Hemodynamic Management in Patients Undergoing High Risk Surgery

# ESA Hemodynamic Monitoring Questionnaire

## 29. When did you finish your training?

- After the year 2000
- 1990-1999
- 1980-1989
- Prior to 1980

## 30. Hemodynamic Management in Patients Undergoing High Risk Surgery

### 30. How many intensive care unit beds does your primary hospital have?

- 7 or less
- 8 to 10
- 11 to 15
- 16 to 20
- 21 to 30
- 31 to 40
- More than 40

## 31. Hemodynamic Management in Patients Undergoing High Risk Surgery

### 31. How many beds does your primary hospital have?

- 100 or less
- 101 to 250
- 251 to 500
- 501 to 1,000
- More than 1,000

## 32. Hemodynamic Management in Patients Undergoing High Risk Surgery

## ESA Hemodynamic Monitoring Questionnaire

### 32. What is the population of your practice location?

- Less than 10,000
- 10,000 to 50,000
- 50,001 to 100,000
- 100,001 to 500,000
- More than 500,000

### 33. Hemodynamic Management in Patients Undergoing High Risk Surgery

#### \* 33. In which country is your practice?

### 34. Hemodynamic Management in Patients Undergoing High Risk Surgery

Thank you very much for taking time to answer these questions.