

**Definitions document**

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## Definitions of preoperative risk factors

### What is the definition of neurosurgery?

Neurosurgical procedures are defined as involving the brain and cervical spine. Surgery on the thoracic and lumbar spine is defined as orthopaedic surgery in the CRF.

### What should I do if some important medical co-morbidities are not included on the case record form (CRF)?

We realise that some patients may have important data which we have not asked for. The CRF has been designed to request only the most important patient data.

### What are the definitions of the chronic co-morbid diseases?

We have not made any definitions for these diseases. We simply want doctors to give what they believe are the most appropriate answers. If the patient probably has the disease, then tick the box. If they probably do not have the disease, then leave it blank.

### American Society of Anesthesiologists (ASA) score

- I A normal healthy patient
- II A patient with mild systemic disease which does not limit physical activity
- III A patient with severe systemic disease which limits physical activity
- IV A patient with severe systemic disease that is a constant threat to life
- V A patient who is not expected to survive for 24 hours without the operation.

### Urgency of surgery

Elective: Not immediately life-saving; planned within months or weeks.

Urgent: Planned surgery within hours or days of the decision to operate.

Emergency: As soon as possible; no delay to plan care; ideally within 24 hours.

### Severity of the surgery

This is the category of surgery which indicates a combination of complexity and amount of tissue injury.

Minor surgery would include procedures lasting less than 30 minutes performed in a dedicated operating room which would often involve extremities or body surface or

brief diagnostic and therapeutic procedures eg arthroscopy without intervention, removal of small cutaneous tumour, diagnostic proctology, biopsy of small lesions, etc.

Intermediate procedures are more prolonged or complex that may pose the risk of significant complications or tissue injury. Examples include laparoscopic cholecystectomy, arthroscopy with intervention, bilateral varicose vein removal, tonsillectomy, inguinal hernia repair, breast lump resection, haemorrhoidectomy, appendicectomy, partial thyroidectomy, cataract surgery, uvuloplasty, minimally invasive repair of vaginal prolapse, vaginal hysterectomy, tendon repair of hand, fixation of mandibular fracture, etc.

Major surgical procedures are expected to last more than 90 minutes and include major gut resection, major joint replacement, mastectomy, extensive head and neck tumour resection, abdominal aortic aneurysm repair, major vascular bypass procedure, procedures involving free flap to repair tissue defect, amputation, total thyroidectomy, cystectomy, trans-urethral resection of prostate, resection of liver tumour, carotid endarterectomy, nephrectomy, total abdominal hysterectomy, spinal discectomy, etc.

## Definitions of postoperative care

### Post anaesthesia care unit (PACU):

A postoperative recovery ward or unit which is dedicated to providing increased postoperative care during recovery (both in intensity of monitoring and in duration of care), when compared to normal postoperative recovery care.

### High care ward:

A postoperative ward which is dedicated to providing increased postoperative care, when compared to the normal postoperative surgical ward.

### Increased frequency of nursing observations:

Nursing observations which are conducted more frequently, than the normal frequency of observations on the postoperative ward.

### Patient's bed in view of the nurse's station:

The patient is positioned in a bed close to the nursing station to ensure that the nurses can always see the patient from the nursing station.

### Family members to stay with the patient in the ward:

If the family members are asked to stay with the patient on the ward, because of a concern that the patient is at increased risk of death or morbidity in the postoperative period.

## Definitions of severe surgical complications

The following definitions and grading are provided for guidance where the nature and severity of a possible complication following surgery is uncertain. These definitions are based on the 'Standards for definitions and use of outcome measures for clinical effectiveness research in perioperative medicine: European Perioperative Clinical Outcome (EPCO) definitions: a statement from the ESA-ESICM joint taskforce on perioperative outcome measures'.<sup>1</sup>

### Definition of a 'Severe Complication'

Results in significant prolongation of hospital stay and/or permanent functional limitation or death. Almost always requires clinical treatment.

### Surgical site infection (superficial)

Infection involving only superficial surgical incision which meets the following criteria:

1. Infection occurs within 30 days after surgery and
2. Involves only skin and subcutaneous tissues of the incision and
3. The patient has at least one of the following:
  - a. purulent drainage from the superficial incision
  - b. organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision and at least one of the following signs or symptoms of infection: pain or tenderness, localized swelling, redness, or heat, or superficial incision is deliberately opened by surgeon and is culture positive or not cultured. A culture-negative finding does not meet this criterion.
  - c. diagnosis of a incisional surgical site infection by a surgeon or attending physician

### Surgical site infection (deep)

An infection which involves both superficial and deep parts of surgical incision and meets the following criteria:

1. Infection occurs within 30 days after surgery if no surgical implant is left in place or one year if an implant is in place and
2. The infection appears to be related to the surgical procedure and involves deep soft tissues of the incision (e.g. fascial and muscle layers) and
3. The patient has at least one of the following:

- a. purulent drainage from the deep incision but not from the organ/space component of the surgical site
- b. a deep incision spontaneously dehisces or is deliberately opened by a surgeon and is culture-positive or no cultures were taken whilst the patient has at least one of the following signs or symptoms of infection: fever ( $>38^{\circ}\text{C}$ ) or localized pain or tenderness. A culture-negative finding does not meet this criterion.
- c. an abscess or other evidence of infection involving the deep incision is found on direct examination, during surgery, or by histopathologic or radiologic examination
- d. diagnosis of a deep incisional surgical site infection by a surgeon or attending physician

### Surgical site infection (organ/space)

An infection which involves any part of the body excluding the fascia or muscle layers and meets the following criteria:

- 1. Infection occurs within 30 days after surgery and
- 2. The infection appears to be related to the surgical procedure and involves any part of the body, excluding the skin incision, fascia, or muscle layers, that is opened or manipulated during the operative procedure and
- 3. The patient has at least one of the following:
  - a. purulent drainage from a drain that is placed through a stab wound into the organ/space
  - b. organisms isolated from an aseptically obtained culture of fluid or tissue in the organ/ space
  - c. an abscess or other evidence of infection involving the organ/space that is found on direct examination, during reoperation, or by histopathologic or radiologic examination
  - d. diagnosis of an organ/space surgical site infection by a surgeon or attending physician

### Bloodstream infection

An infection which is not related to infection at another site and which meets at least one of the following criteria:

- 1. Patient has a recognised pathogen cultured from blood cultures which is not related to an infection at another site

2. Patient has at least one of the following signs or symptoms: fever ( $>38^{\circ}\text{C}$ ), chills, or hypotension and at least one of the following:
  - a. common skin contaminant cultured from two or more blood cultures drawn on separate occasions
  - b. common skin contaminant cultured from at least one blood culture from a patient with an intravascular line, and a physician starts antimicrobial therapy
  - c. positive blood antigen test

### Acute Respiratory Distress Syndrome (ARDS)

Respiratory failure, or new or worsening respiratory symptoms, commencing within one week of surgery; and a chest radiograph or computed tomography scan which demonstrates bilateral opacities not fully explained by effusions, lobar/lung collapse, or nodules; and respiratory failure not fully explained by cardiac failure or fluid overload. Need objective assessment (e.g. echocardiography) to exclude hydrostatic oedema if no risk factor is present.

#### Severity grading:

Severe:  $\text{PaO}_2:\text{FiO}_2 \leq 100$  mmHg with PEEP  $\geq 5$  cmH<sub>2</sub>O

#### Guidance:

If altitude is higher than 1000 m, a correction factor should be calculated as follows: ( $\text{PaO}_2:\text{FiO}_2 \times [\text{barometric pressure}/760 \text{ mmHg}]$ ). PEEP, positive end-expiratory pressure; CPAP, non-invasive continuous positive airways pressure

### Pneumonia

Chest radiographs with new or progressive and persistent infiltrates, or consolidation, or cavitation, and at least one of the following:

1. fever ( $>38^{\circ}\text{C}$ ) with no other recognized cause
2. leucopaenia ( $<4,000$  white blood cells/ $\text{mm}^3$ ) or leucocytosis ( $>12,000$  white blood cells/ $\text{mm}^3$ )
3. for adults  $>70$  years old, altered mental status with no other recognised cause;

and at least two of the following:

1. new onset of purulent sputum or change in character of sputum, or increased respiratory secretions, or increased suctioning requirements
2. new onset or worsening cough, or dyspnoea, or tachypnoea
3. rales or bronchial breath sounds
4. worsening gas exchange (hypoxaemia, increased oxygen requirement or increased ventilator demand)

**Guidance:** Two radiographs are required for patients with underlying pulmonary or cardiac disease. The definition may be used to identify ventilator associated pneumonia.

### Urinary tract infection

An infection associated with at least one of the following signs or symptoms which should be identified within a 24 hour period; fever (>38 °C), urgency, frequency, dysuria, suprapubic tenderness, costovertebral angle pain or tenderness with no other recognised cause, and a positive urine culture of  $\geq 10^5$  colony forming units/mL with no more than two species of microorganisms.

### Acute Kidney Injury (AKI)

Acute Kidney Injury (AKI) Stage	Serum creatinine	Urine output
Severe	Increase of 3.0 times baseline within 7 days or increase in serum creatinine to $\geq 4.0$ mg/dL ( $\geq 354$ $\mu\text{mol/L}$ ) with an acute rise of $>0.5$ mg/dL ( $>44$ $\mu\text{mol/L}$ ) or initiation of renal replacement therapy	$\leq 0.3$ ml/kg/h for 24 hours or Anuria for 12 hours

**Guidance:** Baseline serum creatinine must be measured before surgery but an estimated value can be used if the patient does not have chronic kidney disease.

### Postoperative haemorrhage

Blood loss occurring within 72 hours after the end of surgery which would normally result in transfusion of blood.

### Cardiac arrest

The cessation of cardiac mechanical activity, as confirmed by the absence of signs of circulation. ECG changes may corroborate the incidence of cardiac arrest.

### Other severe complications

If any of the following complications result in a significant prolongation of hospital stay and/or permanent functional limitation or death, then mark 'Other severe complication' as 'Yes'. Note that they will almost always requires clinical treatment.

### Anastomotic breakdown

Leak of luminal contents from a surgical connection between two hollow viscera. The luminal contents may emerge either through the wound or at the drain site, or they may collect near the anastomosis, causing fever, abscess, septicaemia, metabolic disturbance and/or multiple-organ failure. The escape of luminal contents from the site of the

anastomosis into an adjacent localised area, detected by imaging, in the absence of clinical symptoms and signs should be recorded as a sub-clinical leak.

### Arrhythmia

Electrocardiograph (ECG) evidence of cardiac rhythm disturbance.

### (Cardiogenic) pulmonary oedema

Evidence of fluid accumulation in the alveoli due to poor cardiac function.

### Gastro-intestinal bleed

Unambiguous clinical or endoscopic evidence of blood in the gastro-intestinal tract. Upper gastrointestinal bleeding is that originating from the oesophagus, stomach and duodenum. Lower gastro-intestinal bleeding originates from the small bowel and colon.

### Myocardial infarction

Increase in serum cardiac biomarker values (preferably cardiac troponin) with at least one value above the 99th percentile upper reference limit and at least one of the following criteria:

1. Symptoms of ischaemia
2. New or presumed new ST-segment or T-wave ECG changes or new left bundle branch block
3. Development of pathological Q-waves on ECG
4. Radiological or echocardiographic evidence of new loss of viable myocardium or new regional wall motion abnormality
5. Identification of an intra-coronary thrombus at angiography or autopsy

### Pulmonary embolism (PE)

A new blood clot or thrombus within the pulmonary arterial system.

**Guidance:** Appropriate diagnostic tests include scintigraphy and CT angiography.

Plasma D-dimer measurement is not recommended as a diagnostic test in the first three weeks following surgery.

### Stroke

Embolic, thrombotic, or haemorrhagic cerebral event with persistent residual motor, sensory, or cognitive dysfunction (e.g. hemiplegia, hemiparesis, aphasia, sensory deficit, impaired memory).

## Hospital resource use after surgery

We will collect some basic data to describe the treatment resources patients received after surgery.

### Critical care admission to treat postoperative complications:

Postoperative complications requiring admission to critical care to treat the postoperative complications or provide critical care support necessitated by the severity of the postoperative complications.

**Days in hospital after surgery:** Total number of days in hospital after surgery.

**Status at hospital discharge or 30<sup>th</sup> postoperative in-hospital day:** The survival status of the patient at hospital discharge, or at the 30 in-hospital day (if the patient had not yet been discharged following surgery). The study is censored at the 30<sup>th</sup> in hospital postoperative day.

## Reference

1. Jammer I, Wickboldt N, Sander M, et al. Standards for definitions and use of outcome measures for clinical effectiveness research in perioperative medicine: European Perioperative Clinical Outcome (EPCO) definitions: a statement from the ESA-ESICM joint taskforce on perioperative outcome measures. *Eur J Anaesthesiol* 2015;**32**(2):88-105.