

2. ANAESTHETIC TOPICS

2.9 Sickle cell disease

Sickle cell disease is an inherited disease affecting red blood cells and can lead to life-threatening clinical conditions. It is present in approximately 10% of the black population in the UK. Patients with sickle cell anaemia have sickle haemoglobin (HbS). Deoxygenated HbS molecules stick together forming rods, making red cells rigid and sickle-shaped. The sickle-shaped cells have a tendency to obstruct blood vessels, causing tissue hypoxia and pain (sickle crisis). Significant mortality and morbidity is associated with sickle-cell crises such as cerebrovascular incidents and painful joints, chest and abdomen.

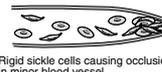
It is imperative that the ODP and theatre team manage care to avoid risk factors that could induce a sickle crisis during the perioperative episode. Sickle crises most often occur during the postoperative phase of care.



Sickle haemoglobin (HbS)



Normal erythrocyte (HbA)



Rigid sickle cells causing occlusion in minor blood vessel

The following conditions must be avoided

- Hypoxia
- Dehydration
- Overtransfusion of blood products
- Hypothermia
- Pain
- Infection
- Anaemia
- Hypoventilation

The role of the ODP will encompass

- Pre-oxygenation
- Adequate hydration
- Transfusion of red blood cells
- Active warming
- Monitoring: close scrutiny of hydration, urine output, temperature and SaO₂
- Administration of oxygen, analgesics and antibiotics

Priorities for the postoperative phase

- Close observation
- Effective analgesia
- Hydration and oxygenation
- Active warming

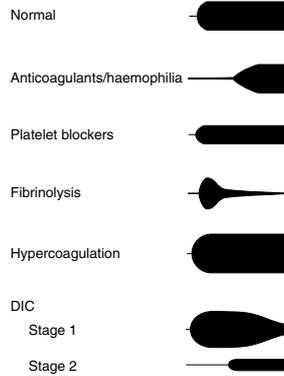
Sources/bibliography: 1. Anaesthesia UK: <http://www.frca.co.uk/>. 2. Sickle Cell Society: <http://www.sicklecellsociety.org/education/sicklecell.htm>.

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2.10 Thromboelastogram

Definition: A measurement of coagulation using a thromboelastogram (TEG®). Gives an estimate of coagulation status.

Application: Perioperative patient management may be safer when coagulation risks such as hypercoagulation, disseminated intravascular coagulation (DIC) and fibrinolysis are accurately diagnosed. In some service units ODPs are responsible for processing tissue samples and recording and communicating the results. ODPs are also involved in subsequent clinical decisions regarding administration of blood products.



Thromboelastograms showing normal and modified arcs Image courtesy of Wenker OC, *et al.* Thromboelastography. *Internet Journal of Anesthesiology* 2000; 1(3)

The COMPUTERIZED Thrombelastograph® (TEG®) coagulation analyser marketed by (thromboelastogram) to aid diagnosis of clotting status. The thromboelastogram is produced when chemically activated blood is analysed. Normal clotting processes include an acceleration and strengthening phase. This phase is monitored as the activated sample is rotated in an arc. The movement (or 'squashiness') of clotted blood is analysed and an image of the arc is produced which demonstrates the strength of the clot.

Sources/bibliography: 1. Cerutti E, *et al.* Thromboelastogram monitoring in the perioperative period of hepatectomy for adult living liver donation. *Liver Transpl* 2004; 10: 289–94. 2. Wenker OC, *et al.* Thromboelastography. *Internet Journal of Anesthesiology* 2000; 1(3).

3. SURGICAL TOPICS

3.1 Patient positioning

Safe positioning of patients is essential for surgical access, and to prevent possible injuries to both patients and theatre practitioners. This can be achieved by assessing the risk, planning the move and correct use of available equipment.

Assessment

Factors to consider to ensure safe and secure positioning of the patient:

Patient factors	Other factors to consider
Age, height, weight, skin condition, cardiopulmonary and nutritional status, pre-existing conditions, type and length of procedure	Staffing levels, patient position, surgical access, types of transfer equipment, patient protection, table supports, pressure on major blood vessels (venous return and cardiac output), possible nerve damage

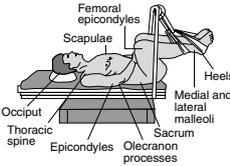
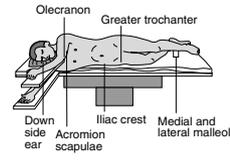
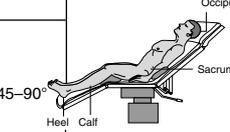
Common patient positions

<p>Supine</p> <p>Patient lies on back Arms at side, supported, palms down If arms on armboard, palms up Legs straight and in alignment Hips parallel to spine Protect bony prominences</p>	
<p>Prone</p> <p>Patient lies face down Use of specialist mattress or pillows to ensure abdomen is free Head positioned to ensure access to airway Arms by side or supported by armboard Protect bony prominences</p>	
<p>Trendelenburg</p> <p>Modification of supine position Table is tilted into a head-down position Degree of tilt to be agreed by surgeon/anaesthetist In reverse Trendelenburg, table is tilted head-up</p>	

Key points

In order to prevent nerve damage the arms should not be abducted to an angle greater than 90° from the midline. Care needs to be taken with all patient positioning to assess and minimise the risk of nerve damage.

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<p>Lithotomy</p> <p>Patient is moved from the supine position Buttocks are placed level with flex in table Legs are raised and placed into stirrups Stirrups must be level and at correct height for patient Legs are raised and lowered simultaneously to avoid patient injury Padding may be required to protect bony prominences/nerves</p>	
<p>Lateral</p> <p>Patient is placed on non-operative side Patient's back is placed towards the edge of the table Legs are positioned to avoid pressure on peroneal nerve – surgery permitting Abdominal and lumbar supports used Upper arm supported on curved arm board or pillow</p>	
<p>Fowler's (sitting)</p> <p>Patient starts in supine position, buttocks at flex and knees at lower flex Foot section lowered slightly, knees flexed Upper section raised to form back of chair: 45–90° Table tilted slightly backward Arms supported by boards or pillows</p>	
<p>Hazards</p> <p>Frequent sites of injury Brachial plexus: patient's head turned sharply Ulnar nerve: compression of elbow against table/mattress Radial nerve: avoid external pressure on the nerve Sciatic nerve: curves superficially around neck of fibula; could be against lithotomy poles Facial nerve: avoid unnatural facial alignment and compression of the face; use supports</p>	

Other potential problems

- Twisting injuries
- Soft tissue injuries
- Musculoskeletal injuries
- Shearing injuries to skin
- Compartment syndrome

Sources/bibliography: 1. Anderton JM, Neave R. *Positioning the Surgical Patient*. London: Butterworth, 1988. 2. Beesley J, Pirie S (eds). *NATN Standards and Recommendations for Safe Perioperative Practice*. Harrogate: National Association of Theatre Nurses, 2004. 3. Davey A, Ince C (eds). *Fundamentals of Operating Department Practice*. London: Greenwich Medical, 2004.

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3.2 Surgical handwash procedure

This activity is performed to reduce the risk of contamination in the clinical environment (NATN, 2004). The surgical handwash is an extension of the standard hygienic handwash procedure.

Occlusive dressings should be placed over skin lesions and jewellery removed. Hands should be washed immediately before beginning the surgical handwash. During the surgical handwash the scrubbing brush can cause skin damage and an increase in skin cell shedding. Brushes can be used, but only for brushing the nails. Nails can be cleaned using a disposable nail pick.

During this procedure the fingertips are considered the cleanest area. The elbow and proximal forearm are considered the least clean. Movement from fingers towards elbows reduces the risk of hand contamination.

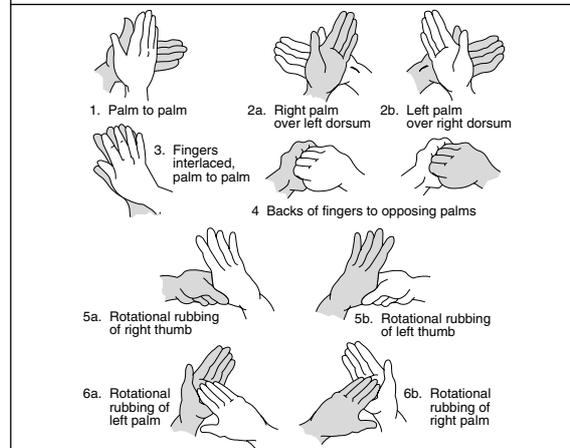
Ensure that the hands and forearms are wet before applying scrub solution. Select and dispense an appropriate measure of aqueous disinfectant solution (such as chlorhexidine or povidone-iodine preparations).

First wash

The systematic six-step handwash procedure should be performed (see illustration).

1. Palm to palm
2. Right palm over left dorsum and left palm over right dorsum
3. Palm to palm, fingers interlaced
4. Backs of fingers to opposing palms with fingers interlocked
5. Rotational rubbing of right thumb clasped in left palm and vice versa
6. Rotational rubbing back and forward with clasped fingers of right hand in left palm and vice versa

This wash must include the arms up to the elbows



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Two subsequent washes

The procedure continues with two more modified washes before drying the hands. This time wash the hands (using the Ayliffe six-step hand wash) and two-thirds of the forearms. Do not extend the wash to the elbows this time. This is to avoid compromising the cleanliness of the hands.

Hands must be rinsed thoroughly from the fingertips to the elbows, allowing excess water to drain from the elbows into the sink. The taps are turned off with the elbows to avoid contaminating the hands and forearms.

The hands and arms should be dried by placing the opposite hand behind a towel and blotting the skin, using a corkscrew movement to dry the hand to the elbow. The towel must not be returned to the hand once the arm has been dried. The hands must be held higher than the elbows and away from surgical attire to avoid contamination.

Patient care and professional issues

Hands should be washed thoroughly using the standard procedure whenever gloves have been worn. Water-based emollient is applied if appropriate. The National Patient Safety Agency (NPSA) has published a patient safety bulletin concerning latex allergy and its contents should be familiar to all ODPs.

Taking good care of your skin to minimise the risk of contamination is your responsibility. The standard to which you practise may have an effect upon patient outcomes.

Sources/bibliography: 1. Ayliffe GAJ, *et al.* Hospital-acquired infection: principles and prevention. Oxford: Butterworth Heinemann, 1999. 2. Damani N. *Manual of Hospital Infection Control Procedures*. London: Greenwich Medical Media, 2003. 3. Gould D. Hand decontamination. *Nurs Stand* 2000; **15**(6): 45–50. 4. Beesley J, Pirie S (eds). *NATN Standards and Recommendations for Safe Perioperative Practice*. Harrogate: National Association of Theatre Nurses, 2004. 5. Pratt RJ, *et al.*; Department of Health (England). The EPIC Project: developing national evidence-based guidelines for preventing healthcare associated infections. *J Hosp Infect* 2001; **47**(Suppl): S3–82. 6. Swarbrook S, *et al.* (Protocol) Surgical scrubbing to reduce surgical site infection. The Cochrane Database of Systematic Reviews; Issue 2. Cochrane Library. Chichester: Wiley, 2003. 7. Centers for Disease Control, Atlanta. Morbidity and Mortality Weekly Report 2002; **51**(RR-16). Guidelines for Hand Hygiene in Health-care Settings. <http://www.cdc.gov/mmwr/PDF/rr/rr5116.pdf>. 8. Hospital Infection Society. Behaviours and rituals in the operating theatre. Dublin, 2002. <http://www.his.org.uk/> 9. National Patient Safety Agency. <http://www.npsa.nhs.uk>