

EXAMINATION TO COVER TRAINING ON CAESAREAN SECTION

NAME OF TRAINEE..... DATE.....

Time needed for examination is 1.5 hours

MAXIMUM SCORE = 1055

1. Please answer true or false next to the statements below regarding delivery by Caesarean section (CS):

1.WHO suggests that systems should be in place to ensure that Caesarean section is performed in a minimum of 10% of all expected births. **FALSE (should be 5%)**

2. CS should NOT routinely be undertaken for preterm birth, small for dates fetuses or post-term pregnancy, unless fetal distress is detected, or other signs of placental compromise are present. **TRUE**

3. For Category 1 CS, decision to delivery time should be 60 minutes or less. **FALSE (should be 30 minutes or less)**

4. For Category 2 CS, decision to delivery time should be 75 minutes or less. **TRUE**

SCORE = 20

2. In the box below list at least 15 reasons why CS should be undertaken.

1. Placenta praevia
2. Abruption with continued severe bleeding or fetal distress
3. Uterine rupture
4. Fetal distress
5. Obstructed labour
6. Prolapsed cord if the fetus is still alive and cannot soon be delivered
7. Mal-presentations/malpositions, for example transverse lie
8. Two or more previous CS
9. Severe maternal illness such as pre-eclampsia or eclampsia where urgent delivery is needed, and where vaginal delivery is unlikely in 24 hrs for pre-eclampsia and in 12 hrs for eclampsia (provided there is no fetal distress in the interim)
10. Failed induction of labour
11. A pregnant woman with a singleton breech presentation at term may be considered for CS. However, if she arrives in established labour, with no signs suggesting disproportion, no fetal distress, an estimated fetal body size which is not large (clinically and/or on USS), and no history of a previous CS or medical complication of pregnancy such as pre-eclampsia, it may be appropriate to offer vaginal delivery. This is provided that a competent person trained in breech delivery is present. External cephalic version (ECV) may be attempted for a woman who has a breech presentation at or after 36 weeks gestation, if she is not in labour and has intact membranes. Contraindications to ECV include uterine scar or abnormality, fetal distress, vaginal bleeding, or certain medical conditions.
12. Delivery by planned CS should be advised for maternal sickle cell disease with evidence of fetal compromise before the onset of labour.
13. In twin pregnancies where the presentation of the first twin is not cephalic, the effect of CS in improving outcomes for the babies is uncertain. If the leading twin is transverse or oblique, then CS is required. However, if the leading twin is breech, then, provided there are no signs suggesting CPD, no fetal distress, estimated fetal body sizes which are not large (clinically and/or on USS), and no history of a previous CS or medical complication of pregnancy (such as pre-eclampsia), vaginal delivery could be the best option, especially for the mother's safety. A competent person trained in vaginal breech delivery and twin delivery must be present.
14. Suspected morbidly adherent placenta, which is a more likely complication if there has been one or more previous CS, and there is an anterior placenta.
15. The presence of large fibroids in the lower segment of the uterus preventing descent of the presenting part.
16. The presence of certain major maternal medical disorders, including cardiac disease, where vaginal delivery might be considered more dangerous than CS.

SCORE = 75

3. In the box below describe the most important actions you **must undertake** before a CS is undertaken

1. Obtain informed consent for CS, and for tubal ligation if appropriate.
2. Check mother's name, medical and surgical history, drug allergies and family contact details.
3. Avoid performing a CS if the fetus is dead, and there is no maternal indication.
4. Take blood for Hb, group & save and cross-match for all Caesarean sections. This is especially important if there is a high risk of bleeding (eg placenta praevia), or if there is severe anaemia. Ideally fresh donor blood if available.
5. Listen to the fetal heart rate, before moving to theatre, and just before starting the operation.
6. Examine for fetal presentation, and to assess whether vaginal delivery might be achievable. Ideally use ultrasound examination to confirm.
7. Ensure safely secured IV cannula, and start an IV infusion with a crystalloid such as Ringer-lactate/Hartmann's solution or 0.9% saline.
8. Especially if abruption and/or pre-eclampsia are present, check for blood clotting using the 7- minute tube test. If coagulopathy is suspected, try in advance to obtain fresh donor blood for transfusion.
9. Ensure oxytocin and misoprostol are immediately available.
10. Check resuscitation equipment for newborn infant is ready and working.
11. Patient to lie in left lateral tilt position.
12. Ensure protection from exposure to HIV, as well as Hepatitis B and C, by appropriate apron, gown, gloves and visor for the surgeon, assistant, and scrub nurse.
13. Insert urinary catheter under strict asepsis, to protect bladder and monitor urine output.
14. Ensure sterile procedure: iodine or chlorhexidine solution and sterile drapes etc.
15. Use aqueous iodine vaginal preparation before CS in women with prolonged ruptured membranes to reduce the risk of endometritis. Alternatively, aqueous chlorhexidine vaginal preparation can be used. Do not use alcohol preparations. Apply with swab on sponge-holder and include in swab count.
16. Start 72-hour course of IV antibiotic just before skin incision.

SCORE = 75

4. In the box below **list additional measures** that are important before undertaking CS

1. Pre-load IV infusion immediately before surgery if spinal anaesthetic, and ensure lateral left tilt with wedge or pillow
2. Ensure all necessary surgical equipment is available
3. Ensure trained midwife, or ideally neonatal clinician, is present in case neonatal resuscitation is needed. This is especially important for fetal distress, thick meconium or preterm delivery.
4. Ensure emergency anaesthetic drugs and equipment are present and working.
5. Is the indication for CS still valid?
6. Minimise risk of gastric content aspiration. This is a particular risk with Caesareans under GA. For elective Caesareans, nil by mouth for 4-6 hours, plus an antacid such as 30 mL of 0.3% sodium citrate (preferably non-particulate) or 300 mg of magnesium trisilicate. Antacids reduce the stomach acid thereby minimising damage to the lungs if aspiration occurs.
7. If pubic hair could interfere with incision, shave immediately before disinfection of skin.
8. Have a whiteboard in the operating theatre on which to record swab, needle and instrument counts.

SCORE = 30

5. In the box below describe the performance of urinary catheterisation and CS. When do you undertake it and when do you remove the catheter?

The woman must be catheterised and her bladder emptied before starting the CS, both to reduce the risk of injury to the bladder, and to monitor urine output.
Remove the catheter 8 hours after surgery if the urine is clear; if not, wait until it is.
If the urine is heavily bloodstained and does not clear, consider possible damage to bladder or ureter.
Wait > 48 hours before removing the catheter if there has been:

- uterine rupture
- prolonged or obstructed labour
- gross perineal oedema
- sepsis with pelvic peritonitis

If the bladder was damaged, leave the catheter in for at least 7 days. The urine should be clear of blood at the time of catheter removal and remain so after 48 hours. If the woman is not receiving antibiotics, give nitrofurantoin 100 mg (or cefalexin 500mg or amoxicillin 500 mg) orally once daily until the catheter has been removed.

SCORE = 20

6. In the box below describe how you would prepare the skin for a CS.

Tincture of chlorhexidine, iodophor (such as Povidone iodine) and tincture of iodine are the recommended antiseptic products for preparing the patient's operative site. Apply three times to the incision site using disinfected ring forceps and a cotton or gauze swab. Do not contaminate the glove by touching unprepared skin. Begin at the proposed incision site and work outwards in a circular motion away from the incision site. At the edge of the sterile field, discard the swab. SCORE = 10

7. In the box below describe how you would give antibiotics prior to CS and which antibiotic would you use?

All patients should be given a prophylactic antibiotic, ampicillin 2 grams IV, immediately before the skin incision. In the case of penicillin allergy, an alternative antibiotic should be used. SCORE = 10

8. In the box below describe how you would choose the possible ways in which you could undertake the **skin** incision and describe the two main transverse skin incisions you could use. Also describe when you might use a vertical **skin** incision.

Abdominal and uterine scars are two separate issues. Classical section is a vertical uterine scar, usually but not always associated with a vertical abdominal scar. A vertical abdominal scar may be present with either a classical or lower segment uterine scar.

The choice of skin incision depends on the following:

- the gestational age of the fetus
- the indication for section
- the presence of previous scars
- the operator's surgical experience

A minimum length of 15 cm is indicated (which accommodates an open Allis forceps).

Make the skin incision to the level of the fascia.

Excision of the previous scar is not essential for better healing and cosmetic results, unless there is keloid scarring.

There are two MAIN possibilities, namely the Pfannenstiel incision and the Joel-Cohen incision. A low transverse incision is preferred to the vertical incision, as there is less likelihood of wound dehiscence and hernia.

The Joel-Cohen technique includes a straight transverse incision through the skin, 3 cm below the level of the anterior superior iliac spines. (This is higher than the Pfannenstiel incision; see below).

The **Pfannenstiel incision** consists of a curved skin incision, two finger-breadths (3-4 cm) above the symphysis pubis,

The surgeon must always ensure that the access to the uterus is adequate to deliver the fetus without difficulty. In the presence of scarring, a Pfannenstiel incision may give better exposure.

The low vertical incision

A vertical incision is made from the base of the umbilicus to the pubic hair line. This is preferred if better exposure is needed, or if local anaesthesia is used. It may be extended upwards to allow access to the upper abdomen. It may be used to provide access for a midline uterine incision. (Classical or DeLee).

SCORE = 30

9. In the box below describe for each of the two main transverse incisions used for CS on how you would undertake the opening of the fascia, rectus muscles and peritoneum.

The Joel-Cohen technique includes a straight transverse incision through the skin, 3 cm below the level of the anterior superior iliac spines. (This is higher than the Pfannenstiell incision; see below). The subcutaneous tissues are opened only in the middle 3 cm. The fascia is incised transversely in the midline and then extended laterally with a finger. Finger dissection is used to separate the rectus muscles vertically and laterally, as well as to open the peritoneum. All of the layers of the abdominal wall are stretched manually to the extent of the skin incision. The bladder is reflected inferiorly. The myometrium is incised transversely in the midline, but not to breach the amniotic sac, then opened and extended laterally with finger dissection.

The Pfannenstiell incision consists of a curved skin incision, two finger-breadths (3-4 cm) above the symphysis pubis, transverse incision of the sheath, blunt separation of the rectus muscles, and incision of the parietal peritoneum in the midline.

Opening the abdominal rectus muscles and fascia

1. Make a 2–3 cm vertical incision in the fascia using a scalpel.
2. Hold the fascial edge with forceps, and broaden the incision from side to side using scissors and finger dissection. Extend laterally to the extent of the skin incision.
3. Ensure all bleeding points from the rectus sheath are closed off.

Opening the peritoneum

1. Grasp and elevate the parietal peritoneum with non-toothed forceps. Ensure bowel or bladder are not caught, and incise and open the peritoneum with scissors.
2. Open visceral peritoneum covering the anterior surface of the lower uterine segment. Elevate the vesico-uterine fold after lifting it with forceps, then ensure bladder is not included and open with scissors 3cm each side from the midline.
3. Push down the bladder with fingers and a swab.
4. Insert Doyen retractor. Ensure bladder is completely reflected, and ureters not at risk.

SCORE = 40

10. Describe how you would open the uterus when undertaking one of the main two transverse incisions described above. Also describe how you would protect the bladder.

1. Use a scalpel to make a 3 cm transverse incision in the lower segment of the uterus. It should be about 1 cm below the level where the vesico-uterine peritoneal fold was incised to bring the bladder down. A transverse decision is used because less dissection of the bladder is needed, entry into the uterus is easier, there is less blood loss, lower incidence of uterine rupture with subsequent pregnancies.
2. Widen the incision by placing a finger at each edge and gently pulling upwards and laterally at the same time.
3. If the lower uterine segment is thick and narrow, extend the incision in a crescent shape, using scissors instead of fingers to avoid extension into the uterine vessels.
4. It is important to make the uterine incision large enough to deliver the head and body of the baby without tearing the incision.
5. If a lower transverse incision is found to be inadequate, it can be extended upwards in a J-shaped incision to avoid blood vessels and enable adequate access.
6. When CS is performed in the 2nd stage, there is a danger of entering the cervix or anterior vaginal fornix and therefore make incision slightly higher in the lower segment.

Score = 40

11. In the box below describe when 1) it would be appropriate to undertake a high vertical uterine incision and then 2) when it would be appropriate to perform a low vertical uterine incision (De Lee's incision)

1) A high vertical uterine incision

- an inaccessible lower segment due to dense adhesions from previous Caesarean section
- transverse lie (with the baby's back down), for which a lower uterine segment incision cannot be safely performed
- fetal malformations (e.g. conjoined twins)
- Large fibroids in or over the lower segment
- placenta praevia
- carcinoma of the cervix

2) A low vertical uterine incision

A lower vertical incision (De Lee's incision) can be useful if the lower uterine segment is poorly formed and thick, in which case a transverse incision would be unwise.

SCORE = 20

12. Please answer TRUE or FALSE next to the statements below regarding CS

1. It is not necessary to ensure that there is no dead space left after surgery **FALSE**
2. It is safer to transfer sharp instruments directly into a basin/tray **TRUE**
3. It is best to retract tissue with instruments, **TRUE**
4. It is best to reposition suture needles with forceps **TRUE**
5. Ideally you should remove the needle before the final tying of sutures. **TRUE**
6. You must be aware of the closeness of the uterine arteries to the ends of the uterine incision and be very careful not to extend the incision by tearing it and damaging these arteries. **TRUE**
7. An infusion of oxytocin is **not** needed after every CS. **FALSE**
8. There is **no** increased risk of PPH after a CS undertaken for placenta praevia. **FALSE**

SCORE = 40

13. In the box below describe how you would deliver the fetus and placenta at CS.

1. Place one hand inside the uterine cavity between the uterus and fetal head. Using your fingers, grasp and flex the head.
2. Gently lift the baby's head through the incision, taking care not to extend the uterine incision.
3. With the other hand, apply fundal pressure to help deliver the baby. If you have an assistant, he or she could apply fundal pressure.
4. Rotate head to Occiput-Anterior position to deliver through incision taking care not to extend the incision down towards the cervix.
5. Deliver the shoulders and body. Be aware of the proximity of the uterine arteries to the ends of the uterine incision and be very careful not to extend the incision by tearing it and damaging these arteries.

Following delivery of the baby

- Give oxytocin 5 to 10 IU IV over 2-3 minutes to aid delivery of the placenta, and then infuse 40 units oxytocin in 500 mL of IV fluids (Ringer-lactate/Hartmann's or 0.9% saline) over 4 hours.
- Clamp and cut the umbilical cord. If the baby is in good condition, delayed cord clamping is appropriate.
- Hand the baby to an assistant for initial care.
- If not given prior to incision for CS, give a single dose of a prophylactic antibiotic after the cord has been clamped and cut; ampicillin 2 grams IV or cefotaxime 1 gram IV.
- Keep gentle traction on the cord and massage the uterus.
- Deliver the placenta and membranes.

Delivery of the placenta

Spontaneous delivery of the placenta, after oxytocin has been given immediately after delivery of the baby, and with controlled cord traction, is preferred to manual removal. However, sometimes manual delivery of the placenta will be necessary.

Routine checking of the uterine cavity is essential to ensure no retained placental fragments or membranes present as this cannot always be ensured by inspection of the placenta.

SCORE = 80

14. Describe in the box below how you would deliver a breech at CS

The fetal back should always be kept upwards/anterior during breech delivery. Gentle rotation of the fetal trunk may be required, being careful to grasp the bony pelvis and legs, thereby avoiding damaging the fetal abdomen. The baby is then delivered as if performing a breech extraction vaginally.

In summary, place the fingers of each hand into the groin of the baby and lift out the buttocks and legs. Deliver the arms by the Lovset's manoeuvre; legs and the body up to the shoulders, then deliver the arms. Flex the head and deliver using the Mauriceau-Smellie-Weit manoeuvre. Complete the delivery as for a vaginal delivery.

SCORE = 20

15. In the box below describe the manoeuvres you could use to help situation where the delivery of the fetal head may be difficult and, in particular, describe how you would deliver a fetal head deeply engaged in the pelvis.

Difficulty in delivering the fetal head can occur in the following circumstances:

- a. Caesarean section in the second stage of labour following failed forceps/ventouse, when the head is very low. If the baby's head is deep down in the pelvis or vagina, ask an assistant (wearing sterile gloves and using chlorhexidine obstetric cream) to reach into the vagina (which must be sterilised) and push the baby's head up into the uterus. Then lift and deliver the head.
- b. occiput-posterior position
- c. after-coming head of baby with breech presentation
- d. transverse lie. See next box
- e. prematurity and oligohydramnios , where the lower segment is poorly formed and thick.

Application of forceps when the head is free may be helpful when difficulties are encountered.

SCORE = 30

16. In the box below describe how you would manage a transverse lie before you open the uterus at CS and then describe how you would manage this after the uterus has been opened

Assess the position of the fetus, including the position of the head, before opening the uterus. If the membranes are intact and there is liquor around the fetus, try to convert the transverse lie to a longitudinal lie.

- If the back is upwards, reach into the uterus and find the baby's feet.
- Grasp a foot and pull gently through the incision to deliver the legs and complete the delivery as for a breech extraction.
- If the back is downwards, a high vertical uterine incision may be preferred, but this is too late if only discovered once inside the uterus.
- Following the incision, reach into the uterus and find the feet. Pull them through the incision and complete the delivery as for a breech baby. Be very careful not to tear the incision.
- To repair the vertical incision, three layers of suture will be needed.

SCORE = 20

17. In the box below describe possible problems that may occur with a low lying anterior placenta and how you would manage this situation.

If a low anterior placenta is encountered, find an edge of the placenta and move the placenta laterally or incise through it and deliver the fetus.

An ultrasound scan prior to the operation will help with this issue

SCORE = 10

18. In the box below describe how you would manage placenta praevia at CS. Describe the possible problems and how you would deal with them.

Women with placenta praevia are at high risk of post- partum haemorrhage. An ultrasound scan prior to the operation will help with this issue

- If there is bleeding at the placental site, under-run the bleeding sites with chromic catgut (or polyglycolic acid/ Vicryl) sutures before closing the wound.
- It may also be helpful to compress the lower segment vessels by packing the uterus or inserting a condom-catheter.
- Watch for bleeding in the immediate postpartum period and take appropriate action.
- Re-opening of the abdomen may be needed.
- Fresh donor blood for transfusion is particularly important. Check whole blood clotting time, consider using tranexamic acid and always, if possible, give fresh donor blood transfusion.

SCORE = 30

19. In the box below, describe in detail how you would suture the uterus after a CS.

Suturing of the uterus

1. Polyglycolic acid (Vicryl) sutures are preferred to catgut. Use of thick suture material causes more foreign body and tissue reaction, but if too thin, sutures will cut through the myometrium.
2. Usually the uterus is closed in two layers.
3. Gently grasp the corners of the uterine incision with clamps.
4. Grasp the bottom edge of the incision with clamps. Make sure that it is separate from the bladder. Look carefully for any extensions of the uterine incision.
5. Repair the incision and any extensions with a continuous locking stitch using a robust absorbable suture such as No. 1 or 0 chromic catgut, or polyglycolic acid (Vicryl) on a round bodied needle
6. Begin at the end corners of the incision
7. A routine second layer of sutures is usually undertaken for the uterine incision, as it may help to reduce the risk of haemorrhage and subsequent uterine rupture through the scar.
8. Be very careful not to damage uterine arteries or tie off ureters
9. If there is any persisting bleeding from the incision site, close with figure-of-eight sutures.

SCORE = 40

20. In the box below describe how you would close the rest of the abdomen after the uterus has been sutured. What precautions must you take during this closure of the abdomen.

1. Look carefully at the uterine incision before closing the abdomen. Make sure that there is no bleeding and that the uterus is firm. Use a sponge to remove any clots inside the abdomen.
2. Examine carefully for any injuries to the bladder, and repair these immediately if present.
3. Ensure that there are no instruments or swabs left inside the abdomen. One way of achieving this is to have a white board in the operating theatre on which is documented every swab or instrument used during the operation, and to ensure that these are available when the abdomen is closed.
4. Closure of the parietal and visceral peritoneum is not necessary, as it makes no difference to the healing and strength of the wound. The duration of surgery is thereby reduced, and there may be less tendency to form intra-abdominal adhesions.
5. Close the rectus sheath with a continuous suture of No. 1 Vicryl.
6. In vertical incisions, mass closure of all layers using synthetic suture is appropriate. Ensure full closure of the sheath to prevent herniation of abdominal contents.
7. Suction drains should not be used routinely.
8. If there are obvious signs of infection, pack the subcutaneous tissue with gauze and insert loose 0 catgut (or polyglycolic) sutures. Delay closure of the skin until the infection has cleared.
9. Close the fat layer with interrupted Vicryl sutures.
10. If there are no signs of infection, close the skin with an absorbable subcuticular suture or skin clips.
11. Interrupted mattress sutures are recommended in obese patients, and in cases where delayed healing is anticipated. Deep tension sutures, in addition to closure in layers, are especially useful in obese women with a midline abdominal incision.
12. Apply a sterile dressing.
13. Gently push on the abdomen over the uterus to remove clots from the uterus and vagina. Swab out the vagina to remove any clots. Any bleeding subsequently noted will therefore be recognised as fresh loss.
14. Monitoring urine output Check and record the volume and colour of the urine in the storage bag at the end of the operation. Then empty the urine storage bag, to facilitate post-operative monitoring of urine output.

SCORE = 70

21. In the box below describe the main possible complications of CS

1. In cases of previous CS, or a history of abdominal or pelvic surgery, or pelvic sepsis, bowel may be adherent to the under-surface of the peritoneum. Extra care must then be taken when opening the peritoneum, dividing it transversely under direct vision when possible. In such cases, the peritoneum should be opened with scissors rather than with the fingers.
2. Bladder may be adherent to the lower segment, and care must be taken to push the bladder well down in order to avoid trauma to the bladder or ureters. Emptying the bladder pre-operatively reduces the likelihood of bladder damage.
3. Fibroids may obstruct access to the lower segment. A decision has to be made as to whether to make the uterine incision above, below or around the fibroids, or to cut through them. Alternatively, a classical (midline) uterine incision may be necessary, with its attendant greater risk of scar rupture in future pregnancies. Fibroids must not be removed as there may be a huge associated blood loss.
4. In cases of anterior placenta praevia, the placenta is encountered on making the lower segment incision. This may lead to excessive bleeding.
5. The placenta may be morbidly adherent to a previous Caesarean section scar (placenta accreta). It is important not to damage the uterine wall and its vasculature by delivering the placenta piecemeal. It is necessary to leave the adherent fragment in situ and monitor carefully for bleeding and signs of infection. However, peri-partum hysterectomy may be safer in this situation, especially in a low resource setting where close post-operative monitoring may not be adequate.
6. See next box for managing heavy bleeding
7. Where a trial of forceps has taken place prior to Caesarean section, care must be taken to identify and suture any vaginal or cervical tears, which may bleed heavily.

SCORE = 35

22. In the box below describe how you would manage heavy bleeding **during the surgical performance of a CS.**

Excessive bleeding at Caesarean section is most commonly due to uterine atony, lateral extension of the lower segment incision, or a combination of these two factors. The cause of the haemorrhage, whether due to atony or trauma, should be determined.

Help should be sought from senior colleagues (if available).

The anaesthetist must be informed about the haemorrhage, and blood should already be cross-matched (at least 4 to 6 units). Ideally fresh donor blood.

In cases of vertical extension into the cervix and vagina, suturing should be attempted from the lowest part of the tear before suturing the transverse incision.

Massage the uterus to expel blood and blood clots. The presence of blood clots will inhibit effective uterine contractions.

Broad ligament haematomas In most cases, these haematomas respond well to pressure (which should be applied continuously for at least five minutes). If the haematoma continues to increase in size, the leaves of the broad ligament need to be opened, and the ureters should be identified before suturing the bleeding point.

Atonic uterus If the uterus is atonic despite IV oxytocin and an oxytocin infusion, massage the uterus, continue to infuse oxytocin, and give: ergometrine 200–500 micrograms IM (must not be used if the patient has hypertension or pre-eclampsia), and/or misoprostol 400–800 micrograms orally or 800 micrograms rectally if the mother is drowsy or unconscious. These drugs can all be given together or sequentially.

Transfuse as necessary, ideally with fresh donor blood.

Have an assistant apply firm pressure with a fist over the aorta to reduce the bleeding until the source of bleeding can be found and stopped.

If bleeding is not controlled, additional methods of treatment can be adopted including tranexamic acid, balloon tamponade (condom catheter, B-Lynch sutures or a peri-partum hysterectomy.

SCORE = 50

23. In the box below describe the patients most at risk after a CS.

1. Where uterine rupture has been repaired
2. APH, especially due to abruption (loss of clotting factors)
3. Pre-eclampsia, especially HELLP (low platelets)
4. Multiple pregnancy (increased risk of atony)
5. Polyhydramnios (increased risk of atony)
6. Anaemia (low reserve)
7. Previous CS (bleeding from incision site)
8. Prolonged labour prior to CS (atony)
9. Difficulties delivering the fetus: impacted head and possible tear to lower segment or cervix
10. Patients undergoing blood transfusion after surgery

SCORE = 50

24. In the box below describe in detail how you would manage every patient following CS. In particular describe the use of antibiotics, the management of the wound, the detection of sepsis, fluid intake and nutrition, the prevention of DVT and pulmonary embolus and the management of analgesia and urinary catheter. Also describe how you would manage the discharge home process.

1. Bowel function should be normal after 12 hours. If progress is uncomplicated, give liquids immediately, and solids when the patient is passing gas per rectum.
3. If there was infection, obstructed labour, or uterine rupture, wait until bowel sounds re-appear before giving oral fluids.
4. Keep a dressing on the wound for 72 hours to ensure re-epithelialisation. If blood is leaking, reinforce the dressing or replace it with a new one if it is more than half soaked.
5. Discharge the mother home when her temperature has been normal for at least 24 hours, and she is mobilising and able to eat and drink normally.
6. Notify community midwife on discharge, and warn regarding maternal and neonatal danger signs.
7. Continue prophylactic IV antibiotic (e.g. Ampicillin IV 2-gram 6 hourly for 72 hours).
8. CS wound care should include: a) removing the dressing 72 hours after the CS unless it is wet when it should be IMMEDIATELY changed for a dry dressing, and reviewed daily; b) assessing the wound for signs of infection (such as increasing pain, redness or discharge), separation, or dehiscence; c) gently cleaning and drying the wound daily if any signs of infection or separation.
9. If excessive vaginal bleeding occurs, follow treatment guidelines for PPH but be prepared to re-enter the abdomen if there is a possibility that there is intra-abdominal bleeding from the uterus.
10. Watch for sepsis (fever 37.5 degrees C or more, tachycardia and foul-smelling vaginal secretions), which are more likely with malnutrition, severe anaemia, HIV, previous PROM or PPRM and prolonged labour. If evidence of potentially severe infection (endometritis) give the IV antibiotics for 5 to 7 days. Investigate for a possible infected retained placental fragments, wound abscess or intra-abdominal abscess. Ultrasound scanning will be helpful here.
11. Help to prevent deep vein thrombosis and pulmonary embolus by early and regular mobilisation, compression stockings and the avoidance of dehydration. Consider low molecular weight heparin.
12. Ensure adequate analgesia: involve the nurse anaesthetist.
13. Regularly check Hb. post operatively, ideally using ward-based stick test haemoglobinometer.
14. Remove the urinary bladder catheter around 24 hours post-op, once a woman is mobile after a spinal anaesthetic. Leave it in for at least 7-10 days if there is a possibility of fistula or if bladder damage was repaired during surgery. After removing the catheter, check that the patient is able to pass urine normally, and that there is no retention of urine.

Discharge home; ensure mother and family are aware of danger signs

Score = 80

25. Describe in the box below in detail how you would monitor vital signs after every CS. How often and what would you measure?

Monitor vital signs every 15 minutes for not less than the first 2 hours postoperatively (as per latest MOH guidelines in Liberia). If all is well at 2 hours, then, after sign-off on the monitoring chart by the responsible senior (doctor or obstetric clinician), recordings continue every 30 minutes for the third hour and then 1 hourly for the next 3 hours. Increase frequency of monitoring if vital signs are deteriorating, and undertake appropriate treatment. Note that bleeding can be concealed in the uterus, or occur into the abdomen through the incision or through an undetected uterine tear or rupture:

Observe:

1. Uterine tone (is the uterus still contracted well?)
2. Fundal height (usually at or around the umbilicus after delivery, but helpful to mark on the patient's abdomen the upper position of the fundus immediately following CS and before transfer to the ward)
3. Vaginal and incisional output of any blood
4. Heart rate trend
5. Respiratory rate trend
6. Urine output
7. BP (only changes late in shock in pregnancy)
8. Changes in mental state
9. Hypoxaemia: SpO₂ less than 95%. Ideally, every patient should be on a pulse oximeter
10. Be aware of possibility of shock, best revealed by developing tachycardia and tachypnoea

Use an early warning chart.

Consider involving the mother in assessing the uterus and reporting on any change in vaginal bleeding occurring after delivery.

SCORE = 50

26. In the box below describe your diagnosis and emergency management of 17-year-old primigravida patient who has undergone a CS for CPD and who was in good condition immediately following her return from the operating theatre. Her baby is well and has begun sucking at the breast. However, despite oxytocin IV boluses and an oxytocin infusion, 1 hour after delivery she has become distressed and is showing signs of shock. There is no obvious increase in vaginal bleeding and the uterus is 2 cm above the level marked on the abdomen immediately after the end of the CS. Her heart rate is 120 bpm, her respiratory rate is 28 per minute, BP is 85/40 mmHg, her conscious level is decreasing and she is pale and sweaty (CRT is 5 seconds).

The possibilities here are atonic uterus, bleeding from the uterine incision or possible ruptured uterus, less likely but possible bleeding from the cervix.

1. Palpate for evidence of atonic uterus and immediately massage abdominally. If uterus could be atonic give additional uterotonic treatment
2. Call for help including surgeon and anaesthetist and apply ABC (ensure airway open, give high flow oxygen, ensure bag valve mask available). Ensure functioning IV cannula is present and take blood for Hb and crossmatch 4 units initially. Request live donor be available.
3. Prepare operating theatre for URGENT laparotomy to identify and treat probable bleeding from the uterine incision. Ultrasound may be helpful in identifying intrapelvic haemorrhage.
4. Elevate legs
5. Ask assistant to place a second large bore IV cannula. Give blood transfusion as soon as possible group O negative if available. Whilst waiting for blood for transfusion give 1 litre rapid IV infusion of RL or NS. Fresh blood transfusion is ideal and try and secure this urgently and when available give quickly by compression of bag.
7. If bleeding is not from atonic uterus urgent laparotomy must be undertaken and possible hysterectomy may be required. Do not wait too long for this to be undertaken.
13. Ensure additionally existing genital tract trauma, such as a cervical tear, is not contributing by urgent sterile speculum exam.
- 14 Ensure urinary catheter is in place and functioning.

SCORE = 80