

Caesarean Section

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“In Australia, in 2019, 35% of all women giving birth were delivered by caesarean section”



Transcribed directly from MOGCAST Episode 5. Listen here:

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“Hi, I'm Dr. Hannah Skrzypek and welcome back to the University of Melbourne MOGCAST. Today I'm going to be talking about the caesarean section.

So, let's start with a little bit of history as to where the name caesarean comes from. Well, it's probably thought to come from two Latin words, one that means to cut and another that was the term used to denote babies who were born via postmortem examination. It's also thought to have been derived from the birth of Julius Caesar. However, his mother lived on to see him invade Britain, so this is unlikely to have been the case.

So, what is a caesarean section? Well, it's an operation where a baby is born through an incision made into the mother's abdomen and through her uterus. And it's performed when a clinician or a patient believe that delivery by a caesarean section is likely to provide a better maternal or fetal outcome, or both, than a vaginal delivery. Now, caesarean sections are one of the most common medical procedures performed globally. But what is the rate in Australia and other countries?

Well, in Australia, in 2019, 36% of all women giving birth were delivered by caesarean section. The WHO (World Health Organisation) has published a statement that says that when caesarean section rates rise towards 10% across a population, the number of maternal and newborn deaths decreases. Over the last decade or two, caesarean section rates have definitely risen across the world with the highest rates up to about 50 to 60% of all births. The lowest rates, about 5 to 10%. And then in Australia, as I said, 36%. Globally, it's about 20 to 21% of babies are delivered via caesarean section. So, this is a procedure that you really need to know the ins and outs of. Many of your patients will have or have had a caesarean section. And if you're an obstetrician, this is your operation. This is the operation you are going to become an expert in. So, I'm going to walk you through the who, what, where, when and how of the caesarean section. And we're going to look at it from both the patient's perspective and the surgeon's perspective.

So, let's start with the patient's perspective. With any procedure, a patient needs to know the indications for that procedure; Are there alternatives? What is involved with the procedure? Who's involved with the procedure? What are the risks? And for this case, it's a risk for both mother and for baby. Are there any long-term implications? What's the recovery like? And what preparation do I need to do for the surgery? And in addition to those things, there are sometimes particular things relevant to that individual patient that might be different for them versus another person going in for the same surgery. So, this might include a medication to withhold or a change to insulin dosing prior to surgery for example.

So, let's start with the indications. So, whenever you talk about anything in obstetrics, it's good to think of both maternal and fetal indications for things. And in a caesarean section, we've got both maternal and fetal indications, but also elective and emergency surgery. So, let's start with the elective reasons for a caesarean section.

So, by far the most common reason we do a caesarean section is because someone's had one before and they're having a repeat caesarean delivery. Other common reasons include malpresentation, most commonly a breach presentation where the patient has decided either not to try an external cephalic version or an ECV has been unsuccessful.

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Other common reasons for a caesarean delivery include multiple pregnancies, so twins or triplets, a caesarean at maternal request, placenta previa, prior uterine surgery, and some more uncommon causes for an elective delivery via caesarean include mechanical obstruction to a vaginal birth, such as from a fetal anomaly or a large fibroid, maternal infection with risk of perinatal transmission, such as primary HSV or unmanaged HIV and a few other causes where you wouldn't want to deliver vaginally; perianal inflammatory bowel disease where there can be significant scarring and inflammation in the perineum and this can result in a severe tear, fourth degree tear and resultant fistula formation or cervical cancer. Okay, so that's a run through the elective indications of caesarean section. What about the emergency indications of caesarean delivery?

Well, again, by far the most common cause in an emergency setting is fetal distress warranting delivery and the patient is not deliverable vaginally. So that's the most common emergency reason for a caesarean delivery. Other reasons include failure to progress in labour, obstructed labour, cord prolapse, preterm labour with a non-cephalic fetus or even a preterm labour with a cephalic fetus depending on the situation. Severe pre-eclampsia, where any delay could put mum at significant risk, or severe bleeding, such as can result with a placental abruption. So, what about the alternatives to caesarean delivery? Well, this is a bit tricky, because obviously if you need a caesarean section either the patient or you feel that that mode of delivery is safest for mum and baby. But there are some situations where there are alternative options. An ECV is a great example, so an external cephalic version for a baby in the breech presentation. So, this is a procedure where the baby is sort of spun around by pressing on mum's tummy and the success rate is about 50% in getting that baby to turn from breech then to cephalic presentation.

A breech vaginal delivery, although not performed very commonly in Australia is an alternative if baby remains breech. For multiple pregnancy, twins can be delivered vaginally if the twins are suitable for vaginal delivery. So, this is if twin one is cephalic and they're not too discordant.

And then a trial of scar or a vaginal birth after caesarean section or VBAC is an option if someone has had their first baby born via caesarean section and wants to try a labour this time round.

So next point to go through with the patient is what does the procedure involve and who is involved? So, I guess just quickly about timing of elective caesarean section. If all is well in the pregnancy, then caesars should be booked in the 39th week of gestation. And this is because neonatal respiratory morbidity and composite morbidity is decreased as gestational age increases from 37 to 40 weeks.

About 5% of babies will have TTN, that's transient tachypnea of the newborn, if they are delivered via caesarean section electively at 38 weeks. And this drops down to 3.4% at 39 weeks and 3% at 40 weeks. So electively, we should be planning, if all is well in the pregnancy, to book in our elective caesarean sections in the 39th week of gestation.

So, what happens when a woman goes for a caesarean delivery? Well, the first thing is that she's brought into theatre, and she's prepared for surgery. And that involves getting changed into a gown. She gets TED stockings put on. She'll get a drip put in her hand if one's not in already. Monitoring equipment will be placed. So, this will include a pulse oximeter, a blood pressure cuff and ECG dots. And the midwife and elective surgery will have a listen to the baby.

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And if it's an emergency caesarean section, most commonly performed for fetal distress, the CTG will be continued from the move between the delivery suite and the theatre and continued until such point as in time that it must be removed to prep the abdomen and this is to make sure that the rapidity of the delivery doesn't need to be sped up in case there's a change in fetal condition over those 10 or so minutes.

It's important to prepare the patient that there are going to be lots of people in theatre and they all have a role to play in providing care for mum and baby. So, there's the anaesthetist and the anaesthetic nurse, there's the obstetrician and surgical assistant, there's a scrub nurse and scout nurse, there's a midwife, there can be a paediatrician there as well, and there's a team of theatre technicians who are helping move the patient in and out of theatre and ensure all the appropriate equipment is there.

The procedure is typically done under spinal anesthetic unless there are contraindications to a spinal anesthesia. It's safer for mum and for baby to be awake and protecting airway rather than under a general anesthetic. And once the spinal is placed then the support person is brought in and can sit by your side. We pop a drape up so you're not seeing what's going on behind the sheet. A catheter is then placed into the bladder so that the bladder is empty for the surgery. And so that afterwards, while the spinal is still working and the bladder will not be working and the bladder remains emptied.

But this is removed very soon after surgery, either the same day or the next morning. The surgeon and the anaesthetist make sure that the spinal is working 100 percent before they get started with surgery. But it is important to inform women that it's normal to feel pressure and movement, but they should not be feeling pain.

So, the abdomen is prepped, and antibiotics are given ideally 30 minutes pre incision and an incision is made just above the pubic bone. The layers of the abdomen are divided until the uterus is reached. The uterus is very large at this point with a baby inside, so it grows in front of all the other abdominal organs.

The uterus is incised and then the baby delivered. Usually, he or she can come up to the mum and partner for some cuddles if all is well. The cord obviously needs to be cut before that can happen. The placenta is then delivered by traction on the cord. The uterus is closed in two layers. And the remaining layers are closed, and the patient is left with an incision that's closed either with an absorbable suture or a removable suture taken out, usually on day five, and a dressing is applied over the top and the procedure takes about 40 minutes or so all up.

Afterwards, the patient moves out to recovery and a midwife joins her there and starts usually breastfeeding at that point if mum is keen. And she spends about 30 minutes in recovery having her PV loss checked and her fundus checked to ensure that it's staying nice and contracted until she moves up to the postnatal ward. The spinal wears off, the catheter can be removed, and patients are encouraged to get up and moving nice and quickly. Oral analgesia is required regularly for a few days and patients need to be encouraged to take this as, as dictated by timing, especially in those first 24-48 hours to stay on top of their pain.

The usual stay following surgery is about three nights, but there are some programs in place in hospitals that get people out and home quicker than this.

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And mothers should be, you know, informed that by the time they're getting home, they're really doing everything for themselves and baby. But they have still just had major surgery, so there is a recovery period. So, I guess that now brings us to the risks of caesarean section delivery to both mum and baby and any long-term implications. So, although caesarean delivery is a very common surgery, it's still major surgery, and complications can occur, although they're rare. Some of the complications are inherent to given birth, whether it's by a vaginal route or caesarean section.

But the risks that we really need to discuss with our patients are those that a reasonable person would like to know, and that's particularly frequently occurring risks, and those that are significant serious risks. Overall complications with caesarean delivery are higher when the caesar is performed during labour versus an elective caesar, particularly when the caesarean is performed at advanced cervical dilatation.

So, let's start with mum first. So, with every surgery we can talk about the risk of blood loss. There's about a 5 percent chance that mum might need a blood transfusion to compensate for blood loss in an emergency setting. And if the blood loss is so significant and the uterine tone cannot get managed or the trauma to the uterus is too much to overcome, then a life saving measure for mum is to have a hysterectomy.

And that occurs about five out of every thousand caesarean deliveries. That's a significant risk. So rare, but significant. Other complications; wound infection, bladder infection, abdominal infection, endometritis, and we can reduce these infection risks with antibiotic administration pre incision. DVT and pulmonary embolus, as with all surgeries, damage to neighbouring structures such as the bladder, the ureter, the bowel, vessels that may require further surgery at the time, or potentially even at a later date. Anaesthetic risks and the anaesthetist typically goes through this with the patient.

And then there are implications for a future pregnancy. So, the uterus after one caesarean section has a scar on it and that scar can potentially rupture in a future pregnancy or labour. The placenta can form abnormally over that scar to cause a placenta accreta. And if the patient chooses in their next pregnancy to aim for a trial of SCAR or VBAC, vaginal birth after caesarean there is an increased chance that she will have a repeat caesarean section.

So now, risks for baby. It's important to mention that about one to two percent of the time the baby can get a little nick from the scalpel when we're entering the uterus. You know, we're really going layer, layer by layer, but the baby is usually head, sometimes bottom is right under our incision and unfortunately, rarely a baby can have a little nick from the scalpel as a result.

TTN we've talked about, so transient tachypnea of the newborn, and this is most common in babies below 39 weeks gestation. And then also just some bruising mums are often surprised to find out that their baby was delivered using the forceps despite being delivered via caesarean section, and that there can be some bruising on the face as a result of that. So, it's important just to mention that so they're not you know, surprised or concerned after the fact. All right. So that's the risks for both mum and baby. Just quickly through the preparation, let's course through the preparation for mum.

So, you need to be fasting in an elective setting for six hours prior to the surgery.

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Obviously in an emergency the anaesthetists manage with an unfasted patient, but electively six hours, no food and fluid prior. Bloods, we always want to FBE in a group and hold a group and antibody screen so that we can quickly crossmatch blood if we need it. And we want to FBE to make sure we've got a good starting haemoglobin. Ideally this will have been optimized antenatally and also that the platelet count is normal to allow for a spinal anaesthetic to occur safely. The patient elect, in an elective setting, needs to know what time to come in and where to come in and what to bring. And usually there'll be some written information that can be provided to women with this information.

And then, with the particulars to the patient, are there medications that need to be changed or withheld? Do we need to think about extended DVT prophylaxis? And does the patient need to learn how to administer Clexane while they're in hospital to allow this to happen at home? Are there any differences with the surgery because of previous surgery that the patient's had, such as, you know, the need to make a different skin incision or different uterine incision. Or do we need any additional help such as from our colorectal surgeon colleagues or general surgeon colleagues if we're encountering a difficult surgical abdomen? And then another factor that's really important to discuss antenatally is the plan for postpartum contraception.

Obviously in an emergency caesarean delivery we wouldn't be, you know, tying tubes or popping in an IUD as there's not really that much time to discuss this adequately when you've got fetal distress or an obstructed labour. But if a caesarean section is planned electively and the patient has completed their family, we can do a tubal ligation at the time of caesarean section, we can place an IUD or an Implanon on at the time of caesarean section. And this is something that is vital to talk through antenatally. So, we've gone through now everything from the patient's perspective.

Let's talk through things from the obstetrician or surgeon's perspective. So, on the morning of an elective caesarean section, it's important that the surgeon checks in again with the patient. Check if there's been any changes. Make sure the patient doesn't have any questions. Double check that consent is all signed and valid. Check through the blood tests. Make sure the group and antibody screen is valid and the FBE is all within normal parameters. Make sure the patient's adequately prepared for surgery, that they've fasted or withheld any medications. And then it's a good idea just to have a feel of the tummy and check the lie of the baby so you don't get a surprise when you enter that the lie is different to what you imagined. And at this stage, you know, you can get a reminder about any difficulties you might face by checking the scars on the abdomen, thinking about, entry differences or potential problems that you might face intraoperatively. It's good to just double-check the placental location to ensure it's not low.

If the placenta is low, then we need to be prepared for a higher amount of blood loss. We check the fetal heart to make sure that we've got a viable fetus. And in the emergency setting, especially in a delivery that's been called for fetal distress, we need to make sure that we're continuously monitoring the baby with CTG while we're setting up for the surgery, the spinal etc. In case there's a deterioration of the fetal status and delivery needs to be immediate. even more quickly expedited.

So, as well as checking in with the patient, it's essential to check in with the theatre team and the theatre in charge. So usually I'd head in, you know, say hi to the theatre in charge, let them know that I'm here, go and meet the theatre team of the day.

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And that includes the anaesthetic team, the scrub team, and the theatre techs. We're going to talk through any special positioning, special equipment, special instruments that we may need. If we're expecting lots of blood loss, for example, from a placenta previa, we might want to have extra Green Armytage's on the setup, extra sutures, extra blood products in the theatre fridge, drugs out, B Lynch ready, Bakri ready, etc.

So, it's good to have a little team huddle at the start of the list to ensure that you are prepared for any potential complicating factors during surgery. Other things that the surgeon needs to check in on is whether any hair needs to be clipped prior to prepping, whether there needs to be any extra retraction. If someone's got a large pannus, obviously we need to, usually we make the incision under the pannus. So retraction of that pannus is important. The surgeon needs to ensure there's appropriate DVT prophylaxis in place with TED stockings and sequential compression devices and that typically forms part of the timeout check-in procedure. And then the surgery, obviously, as we talked about before, but after the surgery, it's vital that the surgeon puts in place a plan for post-op care. So, this firstly includes routine post-anaesthetic obs in the recovery bay, but afterwards, they need to make sure that 've put in place appropriate communication around diet, mobilization, DVT prophylaxis, catheter management, dressings and suture management. Medication chart needs to be checked and updated appropriately. Regular medications of the patient need to be charted. And if the surgeon needs a check of an FBE in the morning or any other bloods done the next morning, then this should all be written up and ready to go to the postnatal ward with the patient when they leave recovery.

It's always good to write in the operation note when you're going to review the patient next. And so, this is usually the same day or the next morning. And at this review, it's important to reinforce any long-term implications from the surgery. Particularly if there's been something that's not been routine.

The patient really needs to know what this means for them in the future. And ideally, if there's been a bit of something tricky that's happened a copy of the operation report should be provided to the patient and some written information should be provided to the patient so that when they think about this down the track, they can have a look back and remember things more clearly with the prompt of the written information there. Alright, so that's a course through a caesarean delivery from a patient's perspective and from the surgeon's perspective. And I wouldn't want you to get away without going back to some of the basic sciences, so we really need to shoot through the anatomy of the abdominal wall. This is the anatomy that you need to know as you're performing a caesarean section and not just a caesarean section, but any abdominal surgery.

So, a little bit of anatomy to finish off on. So, there are nine layers of the abdominal wall and knowledge of these layers allow safe entry into the peritoneal cavity. For a caesarean section, we typically make an incision either in a Joel Cohen form, which is a straight incision, three centimetres below the line joining the two anterior superior iliac spines, or a fan and steel incision, which is a curved incision, a little bit lower down, usually two centimetres above the pubic symphysis.

So, the first layer that we go through is the skin. That's an easy one. And then we next encounter the subcutaneous tissues with the superficial fatty Camper's fascia and the deeper membranous Scarpa's fascia. And then, you reach the white fibres of the rectus sheath. Now the sheath is a tricky anatomical structure. It's actually made up of the aponeurosis of the external oblique, the internal oblique, and the transversus abdominis muscles, and finally the transversalis fascia at the back.

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So once you're through the sheath, then there's always a little bit of preperitoneal adipose and areola tissue, and before you reach the peritoneum itself, once you coarse through the peritoneum, then you reach the uterus, which has grown very large in pregnancy and fills the abdomen and grows in front of all the other abdominal organs.

Now, a really important landmark in abdominal surgery, particularly if a midline entry is required, is the arcuate line. And this is a horizontal landmark, above which the aponeurosis of the internal oblique splits around the rectus abdominis, and the aponeurosis of the transversus abdominis courses posteriorly behind the muscles. So, this creates a posterior and an anterior rectus sheath in front and behind the rectus abdominis. So above the arcuate line, both anterior and posterior portions of the sheath need to be closed, whereas below the line, all layers apart from the transversalis fascia, which is always running behind the rectus muscle, fuse forming an anterior rectus sheath only.

So just to repeat that. Below the arcuate line, the aponeuroses of all three muscles form the anterior rectus sheath, and the posterior sheath is absent, with the rectus lying directly on top of the transversalis fascia. And above the arcuate line, there is an anterior and posterior sheath. And the arcuate line is the site where the inferior epigastric vessels enter the rectal sheath to merge with the superior epigastric vessels. And the inferior epigastric is an important vessel to know about so it can be avoided at entry in laparoscopic gynecological surgery.

So that brings me to the end of the podcast. I hope that's been helpful. And is a little sort of way you can refresh things about caesarean section delivery prior to seeing one in real life in theatre.

There's a couple of really useful resources available on the internet. So, there's a great RANZCOG patient information booklet on caesarean section. So RANZCOG is the Royal Australian and New Zealand College of Obstetricians and Gynaecologists. And this is just available if you Google patient information caesarean section RANZCOG, it will come up.

There's also a nice step by step article in the O and G magazine by RANZCOG on caesarean section, also available online. And that has some nice pictures to sort of walk you through the procedure. And then, of course, don't forget your basic sciences with your anatomy of the abdominal wall, anterior abdominal wall, and any textbook that will cover this anatomy of the anterior abdominal wall goes through this really clearly as well.

So, thanks. That's all from me for today. All the best with your studies”