CESAREAN SECT□ON □N A MARE



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CAUSE OF DYSTOC□A
ςMaternal abnormalities induced uterine inertia and obstructions in the reproductive tract(strictures, torsion, masses) canal(pelvic asymmetry from fractures intrapelvic masses or a small pelvis). Defects in the abdominal wall(e.g prepubic rupture) may rarely interfere with the ability of the mare.
ςFetal abnormalities include abnormal presentation, position posture, size or structure.
ςFetal malposture is the most common cause of equine dystocia the most commonly encountered malpostur is forelimb or neck flexion.
vThere are essential 4 prouedures used to resolve dystocia in the mare;
ςAssisted vaginal delivery AVD: where the mare is awake is assisted to a small or great degree in vaginal delivery of an intact.
ς Controlled vaginal delivery CVD: where mare is anesthetized and the clinician is complete control of delivering an intact foal vaginally.
ς Fetotomy:where the dead fetus is reduced to more than one part for removal from the uterus in an awake or anaesthetised mare.

Cesarean section(C-section) is used primarily as an emergency procedure to resolve dystocia in the mare.To understand the indications and procedure for perfonming a C-section,a basic understanding of dystocia is necessary. C-section, where he fetus is removed through an incision in the uterus, If the dystocia cannot be corrected by assisted or controlled delivery in 15-30 min, then cesarean section is indicated to deliver a live foal and/or minimize damage to the mare's reproductive tract.

vAdvantages
ςLess trauma to reproductive tract.
ςBetter subsequent fertility.
ςBetter fetal survival rates than fetotomy or prolonged attempts at vaginal delivery.
vDisadvantages
ςRisks of general anesthesia to mare and live foal.
ςBacterial contamination- an abscess formation
ςit predisposes the mare to the metritis and uterine scarring which impairs future fertility.
ςRequires aseptic technique.

When a mare arrives at the clinic, she is quickly checked to see if the foal can be delivered vaginally or if she must be taken to surgery.
The mare is already anesthetized, which saves time. Also, while one person is doing the manipulation to try to deliver the foal, another person is clipping the mare's belly and prepping her for surgery, to save more time
It is ideal to give sufficient fluids to stabilize the mare before anesthetic induction.

Administration of broad-spectrum systemic antibiotics prior to surgery is indicated since contamination is common when performing a C-section. Intravenous penicillin (20,000 IU/kg) and gentamicin (6.6 mg/kg) are recommended.
Flunixin meglumine (0.44 mg/kg body weight) can be administered intravenously if endotoxemia is a concern.
An IV infusion of guaifenesin (glycerol guaiacolate, GGE) at 5 percent to 10 percent via large-bore needle or a 12 or 14 gauge catheter followed by a bolus administration of 1.5 to 2.0 mg/kg ketamine is used for anesthetic induction. Alternatively guaifenesin and 1.5 to 2.0 grams of thiamylal sodium may be used.

At this time, aseptic preparation should begin immediately.
Intra- and postoperative analgesia are important considerations as part of the C-section
A constant rate infusion of lidocaine (0.05 mg/kg/min) may be used in conjunction with the morphine. Subcutaneous injection of 15 to 20ml of bupivacaine in the incision line at the end of surgery may be done. This reportedly decreases post-surgical pain and may allow the foal to nurse without causing added discomfort to the surgical site of the dam.

PREPARAT□ON FOR OPERAT□ON
ςAs rapid as possible up to delivery of foal.
ςGeneral anesthetic induction and maintenance: 15 min.
ςConcurrent aseptic surgical preparation: 10 min.
vMinimum consumables
ς0 or 2 synthetic absorbable suture material, eg polyglactin 910 .
ς2/0 and double 1 or 2 synthetic absorbable suture material, eg polyglactin 910 or polydioxanone .
ς0 or 2/0 synthetic non-absorbable suture material, eg polypropylene or skin staples.
ςStent bandage.
ςGeneral surgical kit.

There are four teams called into work with a potential C-section candidate: the reproductive people, the surgical group, the anesthesia team, and the neonatal team (the group that deals with the foal). A veterinarian performs an examination of the mare to see what shape she's in upon arrival. A technician puts a catheter in a vein to give medications and fluids. Meanwhile, a member of the reproductive team puts an arm into the birth canal to see what position the foal is in, and if it is still alive.

Within a few minutes of her arrival, she is put into our padded area where we can induce anesthesia--to keep her from straining or feeling pain. We initially lay her on her side and put hobbles on her back ankles so we can winch her hind end off the ground. Having her hind end up helps with repositioning the foal, with her abdominal weight falling away from the back end.
Careful anesthetic management is important, especially if the foal is still alive. The mare must be well-oxygenated to maintain the foal's oxygen supply.

Surgically scrub the whole belly and make an incision on the midline, as for a colic surgery, except this incision goes clear to the udder. The colic incision usually starts at the navel and works forward. As soon as get through the belly wall and look for the gravid (pregnant) horn of the uterus, containing the foal., pull that up out of the incision as much as you can. Then put sterile towels around that gravid horn, because when you cut into it there will be some leakage of fluid. You want that to be soaked up by a towel and not get back into the mare's belly.

Try to find a back or front leg of the foal, to help us position the incision--because you want to cut right over the top of one of the legs. Than make a 15- to 20-centimeter incision through the wall of the uterine horn. The incision is made in an area along the horn where there is not as much blood supply and not too close to the main body of the uterus. If the foal is alive, a team puts the foal on a gurney that already has an oxygen cylinder on it, and they start working immediately on the foal.
A mare can bleed to death if you don't put that stitch around the opening.

WHICH PROTOCOL WE USE IN TURKEY?*
ØWe inhalation anesthesia in caesarean section usually prefer it because it is safer.
ØDomosedan would apply primarily sedation.
ØDomes from the Netherlands I saw the low dose applied. (0.1 ml / 100 kg, total 500 kg at 0.5 ml).Yet, our horses probably be frustrated. This dose is not enough for me 0,2 - 0,3 ml/100 kg IV dose would prefer.
ØIn a prospective 0.1-0.8 ml/100 kg dose of the drug is given.
ØFollowing prepare combination with midazolam and ketamine induction would apply.
ØAfter induction with 3-4 people or animals, leaning against the wall,
ØAs soon as the supporting apparatus of about 1-1.5 min lies on the ground.
ØFollowing intubation with blind shots are applying and are continuing anesthesia with isoflurane.
Ø
* Prof.Dr.Ay□e TOPAL

ςThe surgeon generally does at least a two-layer closure on the uterus, taking the edges and inverting them a little. The whole time you are working on it, the uterus is shrinking (returning to its nonpregnant size), if it's healthy."
ςSurgeons usually don't remove the placenta; it's better to let it come out vaginally.

COMPL□CAT□ONS
ςPost-partum straining □ uterine [Uterus: prolapse] or bladder prolapse.
ςRetained placenta □ septicemia/metritis/laminitis complex .
ςSurgical complications:
ØIncisional infection and/or dehiscence.
ØAnesthetic emergencies and fractures sustained during recovery .
ØPeritonitis due to surgical contamination or uterine wound dehiscence.
ØPost-operative adhesions.
ØHemorrhage from uterine incision.
ØPost-operative shock and disseminated intravascular coagulations (DIC)

The chances for having a live foal following a C-section vary greatly depending how long it takes to get the mare to the referral hospital. If the foal survives the surgery, he'll need oxygen, because he needs to wake up from the anesthesia given to the mare.

AFTERCARE AND RECOVERY
ςThe aftercare for the mare is similar to that of a colic surgery, on the ventral midline of the belly, though with a longer incision.
ςBecause of this long incision, the mare's exercise must be limited during the first part of her recovery, to give the tissues a chance to heal.
ς keeping her in a stall for the first month. Then she can have a little bit of turnout during the second month. The time frame on these recommendations will vary a little bit from surgeon to surgeon, but it mainly has to do with how quickly the body wall heals. By the third month the mare can usually have free turnout
ςThe aftercare for the mare will include antibiotics and anti-inflammatory medication to help reduce the effects of shock. She will also be given oxytocin to help her shed the placenta.
ςMares can be fertile after a C-section but are probably less so than the average mare that season. If the mare had a C-section in May, for instance, it is less likely that she would breed back again that year. It might take her until next year to be fully ready to breed again, and the owner is better off just waiting. If she had a C-section in January or February, however, there might be more chance of getting her rebred that season.
ςAn 80 to 90 % survival rate can be expected in mares that have undergone cesarean section.Foals survival rates after cesarean delivery range from 10 to 30% in the case series for which a 10% foal survival was observed 33% of the foals were delivered alive but fetal deformity was a common for euthanasia.Fertility after C-section appears to be reduced substantially.However conception rates after elective cesarean section appear to be higher than observed after after emergency C-section.

ςLabor in the mare is explosive, and if something goes wrong it can be very stressful to both the mare and the owner. For the inexperienced owner with a pleasure horse or show mare, this can be very traumatic, and they may decide they don't want to risk going through this again.
ς It's usually not the fault of the mare, unless it's a situation where she has a pelvic obstruction like an old fracture. If it's due to something anatomic in the mare, then yes, she'd need a C-section for every foal, and she might not be your ideal broodmare.