Case report

Reconstructive surgery – how much is too much?

Aashik Shetty, Satish Bhat
Yenepoya Medical College, Deralakatte, Mangalore, India
Corresponding author: Dr Aashik Shetty
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Abstract:
Lumbar region is the most common location for meningocoeles. The routine surgical technique for excision involves excision of the redundant dura & the skin with reconstituzione of the thecal sac. The fascia over the para-spinal muscles is brought as a flap over the reconstituted dural sac & sutured to its counterpart to provide additional buttressing. However such simple procedure may not work if the overlying skin is unhealthy for some reason. It is debatable whether the plastic surgical help for local or extensive flap techniques should be sought from the very outset of surgical planning or a trial at initial excision should be given by the initial operating surgeon (neurosurgeon or paediatric surgeon) with involvement of plastic surgical help in case of a complication. Here we present such a case illustrating such a dilemma.

Keywords: Surgical flaps, meningomyelocele repair, fasciocutaneous flaps

Introduction:
Hospital based records from major cities of India showed that the incidence of neural tube defects is 3.9 to 8.8 per 1000 births. Many of the open tube defects are associated with hydrocephalus while closed neural tube defects have lesser incidence of the same. Most of the neural tube defects which are operated are found in the lumbosacral region and are compatible with long term survival with some degree of disability depending on the severity of the defect. The usual technique of the closure of lumbo-sacral meningocoele/myelomeningocoele is to undermine the edges of the skin for a midline closure after the dural sac has been reconstituted. However in certain cases due to reasons of quality of skin or inadequacy of the available adjacent tissue, primary closure of the final skin wound maybe impossible or may breakdown leading to formation of a CSF fistula. We reported here a case of lumbar meningomyelocele in which the primary repair failed leading to formation of a CSF fistula which was re-operated & closed with a fasciocutaneous flap.

Case report:
An 8 year old girl, a case of Chiari 1 malformation & lumbar meningocele, paraplegia since birth & presented after futile attempts of traditional treatment to treat the lesion (possible branding with hot objects). The local skin over the meningocele was scarred & attenuated with loss of vascularity.

She underwent excision of the meningocele, that involved simple repair of the overlying skin. However, she developed wound edge necrosis and dehiscence with CSF leak in the post operative period. This was attributed partially to the bad quality of skin as a result of previous scarring. Plastic surgical help was sought at this point of time and the patient underwent revision surgery. This included a
medial based thoracolumbar fascial flap (forreinforcement) & a rhomboid (Limberg) fasciocutaneous flap for skin cover. Despite all this, she had CSF leak while recovering from the flap surgery which settled only after a third intervention to decompress the ventricles by a V-P shunt procedure.

This particular case makes us ask 2 questions: -
Should the reconstructive technique be used at the time of first surgery itself for every case to ensure a smooth outcome each & every time?
Knowing that we usually work with limited resources- Is it justified to use this approach on each & every occasion? If yes, will it not be a burden on our already constrained resources? If not how do we justify?

Review of literature:
Many surgical techniques for myelomeningocele repair have been proposed.
These techniques include simple skin closure over the repaired dura or more extensive soft tissue closures.
By adding an additional layer, soft tissue closure techniques may protect the spinal canal and may decrease the rate of CSF leak or pseudomeningocele formation. Traditionally, these soft tissue closures have included muscle flaps and fasciocutaneous flaps.
A variety of closure techniques that have been described, closure may be tailored to fit the anatomical requirements of each patient. Zide et al described a simple method of soft tissue closure for myelomeningocele defects that resulted in a decreased complication rate at their center. They proposed releasing the paraspinal musculature from its bony attachments and pulling it medially, making a relaxing incision laterally in the thoracolumbar fascia. Cruz NI et al describe a double Z-rhomboid technique for the closure of large lumbosacral myelomeningocele defects. After the dorsally displaced neural tissue has been reduced into the vertebral canal and a watertight closure of the dura lining the sac has been achieved, the skin defect is surgically converted to the shape of a rhombus. Equilateral Z-plasty flaps are elevated at the sides of the rhombus and transposed across the defect to secure wound closure. Muneuchi G et al describe the use of rhomboid perforator flaps, which was a combination of using a rhomboid flap & preserving paraspinal perforator vessels. Lattismusdorsi flaps are increasingly reported as an alternative to paraspinal muscle flaps. The lattismusdorsi flap requires a larger dissection especially for lower level meningomyelocele & donor site complications have been reported. Wound complications including CSF leak are a significant cause of morbidity post meningomyelocele repair. Zide et al found that the universal adoption of a flap closure led to a significant reduction in the rate of complication.

Conclusion:
The principles of meningomyelocele repair are Adequate dural closure without tension. Healthy skin available for closure. Adequate tissue interposed between dural sac & skin (dura & skin should not lie in apposition).
If any of the principles are compromised it is better to bring in a local flap for augmenting the closure. However in most of the cases of meningomyelocele repair, redundant skin is used for most superficial layer of the closure & para-spinal muscles can be easily mobilized to midline for interposing between dural sac & the skin. The incidence of CSF leakage in these cases is quite low.
Though the primary Surgeon can take this decision independently, some uncertainty may be occasionally
encountered. The Neurosurgeon is always concerned that a delay in wound healing can lead to revision surgery, prolonged hospital stay and drain on the resources of the family and the health care system. Such occasions are where the Plastic Surgeon is better placed to decide on how to close the wound. However, it is difficult to involve the Plastic Surgeon in each & every case of meningocele for possible use of local flaps in all cases of meningocele repair. If a local flap closure were to be used in all such cases we would be probably over-doing and further straining the already limited available resources. On the other hand, a failure of adequate closure unnecessarily prolongs the patient’s hospital stay (strain on hospital resources) and brings further suffering for the patient. While in some cases, the Neurosurgeon will make confident decision on the need for help for soft tissue closure, in few cases there will be some uncertainty.

We suggest to have an “in between” approach, where the Plastic Surgeon is available “as standby” when the case is posted. The Plastic Surgeon is called to evaluate the situation once the dura is closed and take the decision, in doubtful cases. Thus, an appropriate arrangement of schedules and duties will help to make optimum use of scare resources.

References: