Abstract: Meningomyelocele (MMC) is the most common form of spinal dysraphism. Closure of the meningomyelocele defect is a challenge and a variety of reconstructive options are described. Closure of the MMC is critical to prevent infection and neurological deterioration. Twenty five percent of the defects are wide defects which cannot be closed primarily. Meningomyelocele defects in the lower sacral area are more difficult to close than defects in the thoraco-lumbar area because the latissimus muscle is anatomically insufficient to provide total muscular coverage of the meninges in the sacral area. In a case of 4 month old baby with large Meningomyelocele, a double rotation fasciocutaneous flap with a minor modification to usual double rotation was applied for easy tension free closure of the defect and primary closure of the secondary defect. The vertical distal ends of the defect were closed primarily thus reducing the defect size and consequently a much smaller flap could be designed. A tension free easy closure in a short duration with less bleeding is the advantage of this technique.

Keyword: Meningomyelocele, Spina bifida, fasciocutaneous flap, rotation, lumbosacral

INTRODUCTION:
Meningomyelocele is the most common form of spinal dysraphism and affects spinal cord along with vertebrae and the overlying skin, while occurring at an approximate rate of 1 in 800-1000 live births. It is included in the spectrum of neural tube defect. Neural tube defects includes anencephaly, spina bifida, encephalocele, craniorichischisis and iniencephaly. Spina bifida and anencephaly are the two most common forms of neural tube defect. Spina bifida is classified as spina bifida aperta and spina bifida occulta (Figure1).

Figure 1: Showing spina bifida occulta, meningocele and meningomyelocele schematically

Spina bifida aperta is caused by the failure of primary neurulation resulting in exposed neural tissue or meninges with or without cerebrospinal fluid leakage. It includes Meningomyelocele, the severest of the type and meningocele, the less severe form. Spina bifida occulta is caused by defects in secondary neurulation and the meninges and the neural tissue are not exposed. The development and closure of the neural tube are normally completed within 28 days after conception, before many women are aware that they are pregnant. Etiology of neural tube defect is multifactorial. These include factors related to genetic, geographical, low social standard and folic acid deficiency. In 85-90% of the Meningomyelocele cases, hydrocephalus is noted and it is associated with poor prognosis. Mortality rate is approximately 65% to 70% for patients untreated in the first 6 months of life. In 75% of the cases, lumbosacral region is affected, however, motor and sensory losses are observed in lower extremities, rectum and bladder. Large meningomyelocele comprises 25 % of all meningomyelocoeles. Skin closure in large meningomyelocele is considered challenging and the reconstructive options in such scenario are minimal. Regional Muscle cover and fasciocutaneous flap to skin graft have been advocated. In this case study a simple closure technique was employed. Bleeding was less and no major muscles functions were sacrificed.

CASE REPORT:
In most of the cases of the meningomyelocele primary skin closure is possible after reduction and reconstruction of neural tube, as the expanded skin eases the closure. But in large meningomyelocele most part of the skin are so thinned out to survive the post reduction closure. In pursuit of easy method for skin closure of meningomyelocele, a double rotation fasciocutaneous flap was done in a large lumbosacral meningomyelocele.
A four month old child with large lumbosacral meningo(myelo)cele with hydrocephalus was admitted in Paediatric surgery ward (Figure 2). Baby underwent Venticulo-peritoneal shunt first followed by MMC repair at 4 months of age. After the neural tube repair the intra-op defect of 9 cm x 6 cm (54 cm²) was noted (Figure 3).

After the closure of the neural tube, the role of the plastic surgeon in these larger defects is to provide durable coverage of the neural tube to prevent damage to or infection of the neural structures. The expanded skin in the meningo(myelo)cele helps in closure of most of the meningo(myelo)cele defects and commonly closed by the operating surgeon (paediatric surgeon/neurosurgeon). Defects of more than 26 cm² are difficult to close and Plastic surgery assistance is sought (10). McCraw et al described the bilateral bipedicled flaps without lateral relaxing incisions, while Moore et al. stated that relaxing flank incisions were necessary for primary closure without creating undue tension on the midline wound. (11) Methods describing the muscle for closure have been successful for a large defect area. Desperez et al first used the latissimus dorsi (LD) myocutaneous flap in the repair of meningo(myelo)cele defects (1). But the disadvantages specific to this procedure are loss of major muscle function, increased blood loss, and prolonged operation time. Sacral myelomeningocele are more difficult to close because the latissimus muscle is anatomically insufficient to provide total muscular coverage of the meninges in the sacral area. (11) Loss of normally functioning back muscles, which is important for ambulation in a potentially paraplegic wheelchair-bound patient, and increased susceptibility to decubitus ulcers with difficulties in later reconstruction due to loss of gluteal muscles have also been mentioned. (2)

Fasciocutaneous flaps have the advantages of easy surgery with less bleeding and short period of surgery. The bilateral fasciocutaneous flap was first described by Bajaj et al: two fasciocutaneous flaps neighboring the defect were elevated, one to superior and the other to inferior, and transposed to cover the dural repair line. The donor site was closed with split thickness graft. (11). The bilateral preparation of flaps provided coverage without tension and primary closure of donor areas. By not using muscles, both shoulder functions were preserved. The shorter duration of surgical intervention diminished the morbidity of anesthesia. By closing the distal ends, the defect was reduced to smaller size and much smaller flap was elevated to cover the defect. Double rotation fasciocutaneous flap cover provides a simple technique, minimal complication rate and a smooth closure.

BIBLIOGRAPHY


