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Contemporary postnatal plastic surgical management of meningocele

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Summary *Background:* The goals of this study were to review the outcome of the surgical procedure and hospitalization associated with meningocele repair, and to examine the results of different closure strategies.

Methods: Eighty-three consecutive patients having surgery for meningocele over a ten year period form the basis of this study. Thirty-two closures with a mean defect size preoperatively of 11.5 cm² were performed by the neurosurgeon (ADP), and fifty-one closures with a mean defect size of 28.4 cm² by the plastic surgeon (MFA).

Results: Defects up to 12 cm² were closed with local advancement fasciocutaneous flaps. As defect size increased, latissimus muscle flaps were added in 30 (36%) and gluteus muscle in 16 (19%). In recent years, 18 patients (21.6%) with a mean defect of 29 cm² were treated with overlapping of deepithelialized fasciocutaneous flaps to add an additional layer of coverage to the dural closure.

There were 9 major complications, 6 requiring reoperation. There were 10 minor wound failures managed conservatively. Mean hospital stay was 24.2 days. Re-operation increased length of stay to 45 days ($p < 0.0001$). Minor wound problems added 6 days to mean hospital stay. Wound failure did not correlate with either defect size or closure technique. Thoracic location was associated with increased wound failure ($p < 0.05$). Use of a shunt did not increase morbidity. All closures remained durable after discharge.

Conclusions: Location in the thoracic area predicts major wound failure and need for reoperation. Wound complications significantly increase hospital stay. The use of a variety of techniques to achieve multi-layered closures leads to durable coverage for defects of all sizes.

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Introduction

Plastic surgical management of meningomyelocele reflects the evolution and ingenuity of the profession. Just as results with surgical closure in days-old infants have become progressively better, the incidence of the anomaly has decreased. Elective termination of pregnancies may be prompted by alfa-fetoprotein testing or the discovery of a neural tube defect on ultrasound. Multivitamin and folic acid supplementation has been shown to reduce the risk of neural tube defects.¹ Surgical therapy itself has begun to change, with the introduction of fetal surgery for meningomyelocele.²⁻⁴

A role remains for postpartum closure of meningomyeloceles. Many parents do not wish to undergo screening procedures as they feel the management choices are not appropriate. Other patients may choose not to have prenatal care or screening, or do not have access for economic reasons. Of the 83 mothers in this study, only half had seen a provider prior to delivery, so the benefits of prenatal folic acid and multivitamins were not accrued.

The goals of this study were to 1) determine the profile of the patient with meningomyelocele, 2) review the outcome of the surgical procedure and hospitalization, and 3) examine the results of closure strategies.

Methods

Eighty three consecutive patients having surgery in a university tertiary care hospital over a ten year period from 1994 to 2004 form the basis of this study. All records from any hospitalizations or clinic visits at the university were reviewed, as well as correspondence from referring physicians. Wounds were classified as uncomplicated if they required no postoperative care or dressings. Wound slough was defined as any epidermolysis or wound separation that required dressing changes or local wound care. Major wound failure was that requiring reoperation for closure. Defect size was determined at the time of surgery after dural closure was complete.

Results

Patient characteristics, closure strategies, and multiple outcome parameters including length of hospitalization and wound failure were analyzed. ANOVA, chi square analysis,

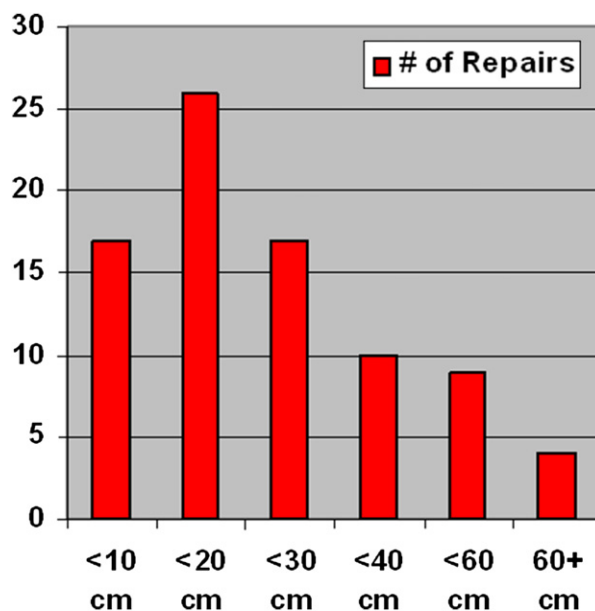


Figure 1 Distribution of defect sizes.

and fisher exact test were performed to determine statistical significance of variables as appropriate.

Table 1 demonstrates general patient characteristics. Mean gestational age was 36.7 weeks, and surgery was performed at a mean age of 1.7 days. Significant comorbidities were orthopedic (30%), neurologic (19%), respiratory (14%), and gastrointestinal (2.4%). Twenty eight (33.7%) were deemed to have significant enough hydrocephalus to merit a shunt at the time of surgery. Defect sizes are illustrated in Figure 1.

Thirty two defects with a mean size of 11.5 cm² were closed by the neurosurgeon. These were closed with local approximation of the paraspinous muscles and advancement of the adjacent skin and fascia. Fifty one of the defects were closed by the plastic surgeon, these had a mean size of 28.4 cm². de Chalain⁵ noted a similar referral pattern. As defect size increased, closure methods became more complex (Figure 2). Defects up to 12 cm² were generally closed with local advancement fasciocutaneous flaps, and overall 63 (75%) of patients had some form of fasciocutaneous advancement. As defect size increased,

Patient characteristics	
Male sex	40 (48%)
Age at surgery (mean)	1.7 days
Gestational age (mean)	36.7 weeks
Size of defect (mean)	22.8 cm ²
Comorbidities	
Orthopedic	25 (30%)
Neurologic	16 (19%)
Gastrointestinal	2 (2.4%)
Respiratory	12 (14%)

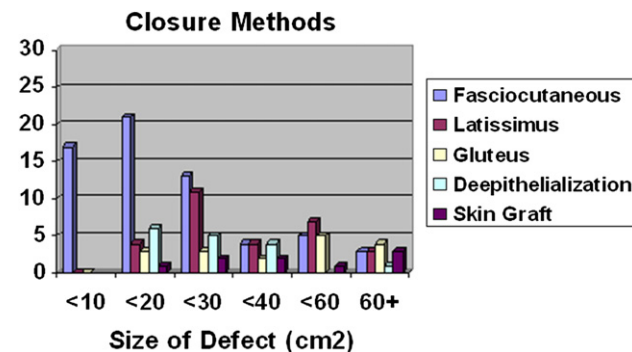


Figure 2 Distribution of closure methods used versus defect size.

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