

Myelomeningocele repair timing



The optimal time to closure of a [newborn](#) with an [open neural tube defect](#) (NTD-myelomeningocele) has been the subject of a number of [investigations](#). One aspect of timing that has received attention is its relationship to repair site and central nervous system (CNS) [infection](#) that can lead to irreversible deficits and prolonged [hospital stays](#).

Systematic Review and Evidence-Based Guideline on Closure of Myelomeningocele Within 48 Hours to Decrease Infection Risk

Appropriate timing for closure of [myelomeningocele](#) (MM) varies in the [literature](#). Older studies present 48 h as the timeframe after which [infection complication](#) rates rise.

The objective of this [guideline](#) is to determine if closing the MM within 48 h decreases the risk of [wound infection](#) or [ventriculitis](#).

The Guidelines Task Force developed search terms and strategies used to search [PubMed](#) and [Embase](#) for relevant [literature](#) published between 1966 and September 2016. Strict inclusion/exclusion criteria were used to screen abstracts and to develop a list of relevant articles for full-text review. Full-text articles were then reviewed and when appropriate, included in the evidentiary table. The class of evidence was evaluated, discussed, and assigned to each study that met inclusion criteria.

A total of 148 abstracts were identified and reviewed. A total of 31 articles were selected for full text analysis. Only 4 of these studies met inclusion criteria.

There is insufficient evidence that operating within 48 h decreases the risk of wound infection or ventriculitis in 1 Class III study. There is 1 Class III study that provides evidence of a global increase in postoperative infection after 48 h but is not specific to wound infection or ventriculitis. There is 1 Class III study that provides evidence if surgery is going to be delayed greater than 48 h, [antibiotics](#) should be given. The full guideline can be found at <https://www.cns.org/guidelines/guidelines-spina-bifida-chapter-4> ¹⁾.

MOMS trial

A prospective, randomized study (the [MOMS trial](#)) has shown that fetal surgery for MMC before 26

weeks' gestation may preserve neurologic function, reverse the hindbrain herniation of the [Chiari II malformation](#), and obviate the need for postnatal placement of a [ventriculoperitoneal shunt](#). However, this study also demonstrates that [fetal surgery](#) is associated with significant risks related to the uterine scar and premature birth. In the future, research will expand our understanding of the pathophysiology of MMC, evaluate the long-term impact of in-utero intervention, and to refine timing and technique of fetal MMC surgery using tissue engineering technology ²⁾.

Controversies

In a cohort from [Texas](#), over one-quarter of patients undergoing postnatal myelomeningocele repair experienced a complication within 30 days. The complication rate was significantly higher in patients who had surgical repair within the first 24 hours of birth than in patients who had surgery after the 1st day of life ³⁾.

Kancherla et al., examined 2006 to 2011 births from the [California](#) Perinatal Quality Care Collaborative, linking to hospital [discharge](#) and vital records. Selected maternal, infant, and delivery hospital characteristics were evaluated to understand disparities in timely repair. [Poisson regression](#) was used to estimate adjusted [risk ratios](#) (aRRs) and 95% [confidence intervals](#) (CIs).

Overall, 399 of the 450 (89%) infants had a timely repair and approximately 80% of them were delivered in level III/IV hospitals. [Infants](#) with [hydrocephalus](#) were significantly less likely to have a delayed myelomeningocele repair compared with those without (aRR = 0.22; 95% CI = 0.13, 0.39); infants whose medical care was paid by Medi-Cal or other nonprivate insurance were 2.2 times more likely to have a delayed repair compared with those covered by a private insurance (aRR = 2.23; 95% CI = 1.17, 4.27). Low birth weight was a significant predictor for delayed repair (aRR = 2.06; 95% CI = 1.10, 3.83).

There was a significant disparity in myelomeningocele repair based on medical care payer. Families and hospitals should work together for timely repair in hospitals having specialized multidisciplinary teams. Findings from the study can be used to follow best clinical practices for myelomeningocele repair ⁴⁾.

Treatment outcomes following documented times to transfer and closure were evaluated at Children's Hospital of Los Angeles (CHLA) for the years 2004 to 2014. Data of newborns with a myelomeningocele with varying time to repair were also obtained from non-overlapping abstracts of the 2000-2010 Kids' Inpatient Database (KID) and Nationwide Inpatient Sample (NIS). Poisson multivariable regression analyses were used to assess the effect of time to repair on infection and time to discharge.

At CHLA, 95 neonates who underwent myelomeningocele repair were identified, with a median time from birth to treatment of 1 day. Six (6 %) patients were noted to have postrepair complications. CHLA data was not sufficiently powered to detect a difference in infection following delay in closure. In the NIS, we identified 3775 neonates with repaired myelomeningocele of whom infection was reported in 681 (18 %) patients. There was no significant difference in rates of infection between same-day and 1-day wait times ($p = 0.22$). Wait times of two (RR = 1.65 [1.23, 2.22], $p < 0.01$) or

more days (RR = 1.88 [1.39, 2.54], $p < 0.01$), respectively, experienced a 65 % and 88 increase in rates of infection compared to same-day procedures. Prolonged wait time was 32 % less likely at facilities with increased myelomeningocele repair volume (RR = 0.68 [0.56, 0.83], $p < 0.01$). The presence of infection was associated with a 54 % (RR = 1.54 [1.36, 1.74], $p < 0.01$) increase in the length of stay when compared to neonates without infection.

Myelomeningocele closure, when delayed more than 1 day after birth, is associated with an increased rate of infection and length of stay in the national cohort. High-volume centers are associated with fewer delays to repair. Though constrained by limitations of a national coded database, these results suggest that early myelomeningocele repair decreases the rate of infection ⁵⁾.

In a retrospective, statewide, population-based study examined infants with open spina bifida (SB) born in Florida 1998-2007. Most infants with SB had surgical repair in the first 2 days of life. Lower level birth hospital nursery care was associated with later repairs ⁶⁾.

References

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