

Dimensions of hysterotomy for fetal spina bifida repair determines prematurity risk

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Objective

Spina bifida aperta (SBA) is a congenital defect associated with progressive deterioration in utero. Prenatal repair by hysterotomy, compared to postnatal repair, has been shown to improve neurological outcomes at the expense of an increased prematurity risk and significant maternal morbidity. Several teams proposed to reduce the dimension of the uterine incision. In a large cohort of repairs by mini-hysterotomy (≤ 3.5 cm), prematurity was less than what was reported in the benchmark Management of Myelomeningocele Study (MOMS), and reported comparable rates of reversal of hindbrain herniation. This comparison, however, did not take into account potential confounders. We aimed to investigate whether prenatal SBA repair through mini-hysterotomy results in less prematurity when compared to standard hysterotomy, but adjusting for confounding factors.

Methods

This is a matched-controlled study, using propensity score matching to adjust for potential prematurity risks, e. g. the gestational age at operation, lesion level, lesion type and parity. Inclusion criteria were women who had a prenatal SBA repair either by hysterotomy (UZ Leuven, Leuven, Belgium) or mini-hysterotomy (The Heart Hospital of Sao Paulo, Brazil). Only patients in whom the original MOMS criteria were met, and data on gestational age at delivery were available, were included. Subsequently, patients with similar propensity score were matched to perform a pairwise comparison.

Results

We retrieved data on 523 patients from 2 consecutive prospective cohorts, of whom 346 met the original MOMS criteria hence were eligible for propensity score matching. Eventually 78 pairs were left for head-to-head comparison. Patients operated through mini-hysterotomy were younger and had a higher BMI. The gestational age at operation through hysterotomy was 25.1 weeks (IQR: 24.7 – 25.4) as compared to mini-hysterotomy at 25.3 weeks (24.6 – 25.7; $p=0.353$). The parity, lesion level and lesion type were also comparable. Mini-hysterotomy reduced the risk of prematurity (birth < 37 weeks) by a factor 1.67 (hazard ratio 0.60, 95% CI (0.42 – 0.85); $p=0.004$). Risk for delivery $\leq 34^{+6}$ weeks was reduced by a factor 1.72 (hazard ratio 0.58, 95% CI (0.34 – 0.97); $p=0.037$). There were no uterine ruptures in both cohorts yet a higher intact uterine scar at birth following mini-hysterotomy (96.2% vs 84.6%, $p=0.025$). Reversal of hindbrain herniation one week after the operation was comparable (82.1% vs 97.4%, $p=0.180$) as well as rate of cerebrospinal fluid leakage at birth (0% vs 2.6%, $p=0.50$).

Conclusion

Prenatal SBA repair through mini-hysterotomy was associated with a later gestational age at delivery and higher chance for intact uterus at delivery, without apparent compromise on in utero reversal of hindbrain herniation rate or increasing the risk for cerebrospinal fluid leakage.