A multicenter study revealed in utero myelomeningocele (MMC) repairs provided better outcomes than postnatal corrective surgery. Previous data from animal models recommended maintaining a minimum alveolar concentration (MAC) of 2-3 MAC for in utero MMC surgery. MAC of inhaled anesthetics is reduced in pregnancy and there is no established MAC of sevoflurane. Earlier reports demonstrated a 28% decrease in MAC of isoflurane in pregnancy. High doses of volatile anesthetics can cause maternal hypotension and require medications for hemodynamic stability.

Methods

Performed a retrospective chart review on 25 in utero myelomeningocele repairs at Children’s Memorial Hermann between 2012 and 2016. Cases numbered 1-15 (Group A) received volatile anesthetics consistent with previous study recommendations of 2-3 MAC. Cases numbered 16-25 (Group B) received volatile anesthetic doses less than 2 MAC. Evaluated phenylephrine doses between the two groups.

Results

Patients in Group B were given lower doses (mg/kg/min) of sevoflurane (average: 0.57, median: 0.6) than patients of Group A (average: 0.57, median: 0.6). A lower percentage of expired sevoflurane correlates with a reduced infusion rate of phenylephrine to manage maternal blood pressure. No additional medications (e.g., nitroglycerin) were needed for uterine relaxation when less than 2 MAC of volatile anesthetic was used. MAC of Sevoflurane is 2.2%. If reduced by 25% in pregnancy, MAC of pregnancy would be 1.65%. Cases 1-15 were run at 2.5 MAC, and cases 16-25 were run at 2 MAC.

Conclusion

The results show a lower dose of volatile anesthetic lessens the amount of phenylephrine needed to manage maternal blood pressure. The results suggest In utero myelomeningocele repairs can be performed with lower doses of MAC. More cases need to be evaluated to find more statistically significant results.

More cases need to be evaluated to determine the minimum amount of sevoflurane (MAC) that can be used for In-utero MMC repair without requiring additional medication for uterine relaxation.

Future studies will focus on minimizing dose of volatile anesthetic and utilization of adjuvant anesthetics while maintaining uterine relaxation.

References


