

CLINICAL CASE REPORT: GENERAL ANESTHESIA FOR CESAREAN DELIVERY IN A PARTURIENT WITH SURGICALLY CORRECTED CHIARI MALFORMATION TYPE I



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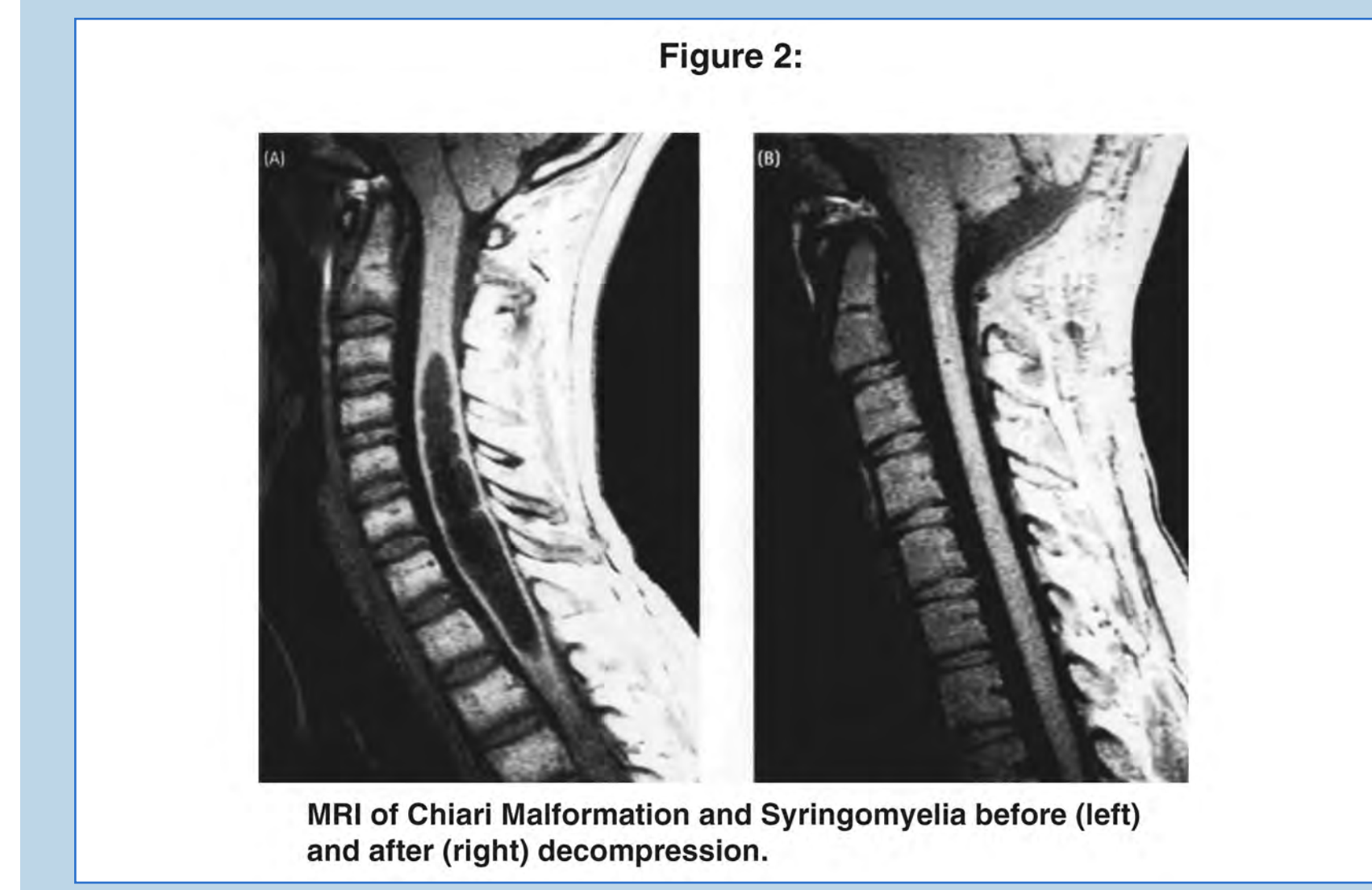
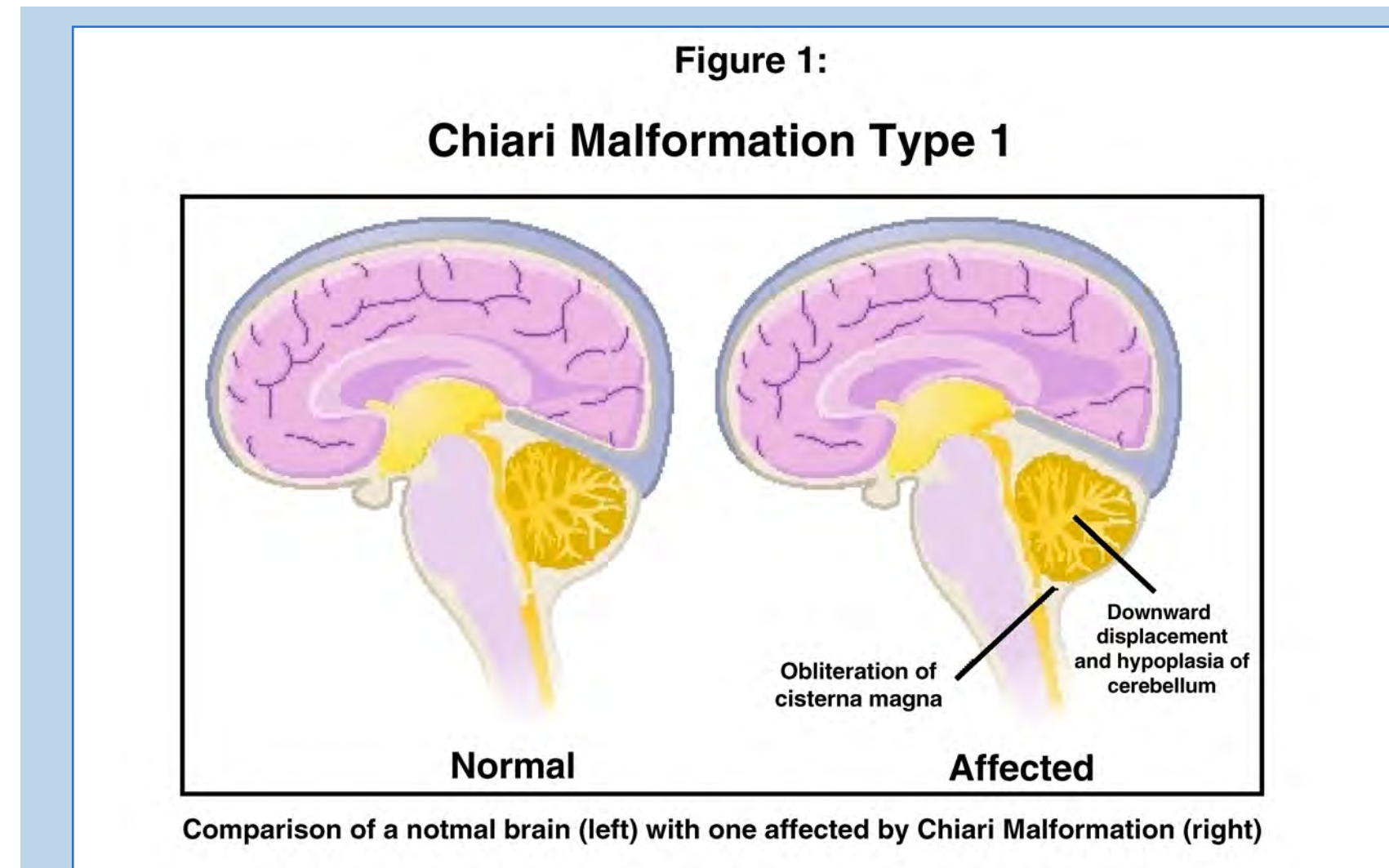
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INTRODUCTION

Arnold-Chiari Malformations are a group of structural defects involving varying degrees of herniation and prolapse of the cerebellar tonsils through the foramen magnum (Fig 1). Type I is the most common and primarily presents with headaches and other symptoms related to increased ICP. Other symptoms include upper extremity neurologic deficits and pain, autonomic derangement, respiratory impairment, and even bulbar symptoms as the condition progresses. Chiari malformation is often associated with syringomyelia, an abnormal CSF-filled cavitation of the spinal cord. Both are diagnosed by MRI and, when asymptomatic, can be managed conservatively. Otherwise, these patients require cervical decompression and duraplasty (Fig 2). These conditions can be further complicated by physiologic changes of pregnancy. Many patients undergo c-section in an effort to control ICP during delivery. Anesthetic management is focused on tight control of ICP so as to not exacerbate any existing herniation. A minimal number of case reports exist in which general, epidural, and even spinal anesthesia have been safely and effectively utilized. We describe the successful use of general anesthesia for Cesarean delivery in a patient with surgically corrected CMI.

CASE

The patient was a 37-year-old primiparous woman with CMI and syringomyelia who had undergone surgical decompression 7 years prior. Her symptoms had been mild and controlled until the pregnancy when she began to have paroxysmal worsening headache, blurry vision, and nausea in addition to upper and lower extremity pain, weakness, and numbness. An attempt at lumbar drainage as well as maximizing therapy with acetazolamide failed to produce resolution. The presence of worsening symptoms along with ultrasonic evidence of fetal maturity contributed toward a decision to undergo a c-section at 35 weeks. Upon admission, the patient's symptoms were as mild as she had experienced during her pregnancy. Physical examination was significant only for mild occiput edema and slightly decreased sensation and motor power in the left lower and upper extremities. Both general and regional anesthesia were discussed but the patient chose the former with stern refusal for the latter. 30ml of 0.3M sodium citrate was given orally approximately 20 minutes preoperatively. Large bore peripheral IV line and right radial arterial lines were placed with local anesthetic infiltration preoperatively. Intraoperative monitoring included the standard ASA monitors, continuous arterial blood pressure transduction, an esophageal temperature probe, a foley catheter, and intermittent nerve stimulator use. The patient was placed supine with left uterine displacement and preoxygenated via facemask for approximately 3 minutes. Induction was performed with fentanyl 100µg, sodium thiopental 450mg, and succinylcholine 100mg. This was followed by smooth and uneventful direct laryn-



gосcopy, application of lidocaine jet 4mL, and intubation with 6.5 ET tube. A healthy child was delivered 9 min. after incision with APGAR scores of 9/9. Anesthesia was maintained with sevoflurane 2% in O₂/N₂O (50%/50%) with supplemental analgesia by fentanyl and then titrated morphine. Hemodynamic stability was maintained with small incremental boluses of esmolol and labetalol. Neuromuscular blockade was maintained with rocuronium and reversed with glycopyrrolate 0.6mg and neostigmine 3mg. In addition, anzemet 12.5mg and decadron 8mg were given as emetic prophylaxis. Smooth emergence and extubation were performed once criteria were met. A morphine IV PCA was utilized for postoperative analgesia. The patient was comfortably discharged home 3 days postoperatively with no notable neurologic deficits.

DISCUSSION

The pathology of CMI centers around herniation of the hindbrain structures. Despite surgical decompression, many patients still have varying degrees of increased ICP and remain at risk for brainstem compression. A detailed pre-anesthetic assessment must focus on a neurologic H&P as well as any notable altered respiratory function or autonomic neuropathy. Some case reports have shown both general and neuraxial anesthesia to be safe and effective but there is still no firm consensus on the best anesthetic management of these patients. Epidural anesthesia certainly has the advantage of avoidance of the potential hazards of airway control. However, blockade should be slow and incremental to avoid the possibility of a precipitous drop in blood pressure with preexisting autonomic neuropathy as well as trans-meningeal transfer of pressure leading to subarachnoid compression and subsequent ICP elevation. Spinal anesthesia poses the ominous fear of herniation. However, this should *theoretically* not be of concern for the surgically corrected patient and, in fact, a few successful and uncomplicated case reports do exist. The performance of general anesthesia must focus on avoidance of sudden increases in ICP. To date, grossly uncomplicated general anesthesia has been described in case reports, with the exception of notable prolonged neuromuscular paralysis which was not evident in this patient. We performed general anesthesia with rapid sequence induction paying careful attention to avoid elevations in ICP through the use of deep anesthetic induction and topical airway analgesia for laryngoscopy, intra-arterial blood pressure monitoring along with tight hemodynamic control via short acting beta-blockade, and emetic prophylaxis.

CONCLUSION

It is hoped that this report will lead to the development of stronger evidence-based recommendations.

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