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*Case Report*

# Postoperative cardiorespiratory arrest in a case of cervical meningocele

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## ABSTRACT

**Background:** Meningoceles are congenital herniation of meninges and cerebrospinal fluid (CSF) through the skull and are bereft of any cerebral tissue. They are commonly found over the anterior fontanelle. Although some cases of cervical dysraphism have been described in the literature, a true meningocele has rarely been seen. The child usually presents with hydrocephalus with features of raised increased intracranial pressure. Sensory, motor, and sphincter functions may be involved depending on the level of lesion. Closure of meningocele should be ideally done within the first 48 h of birth.

**Case Description:** Complications associated with meningocele range from learning disabilities, seizures, and bowel dysfunction to complete paralysis below the level of the lesion. The postoperative complications reported are wound infection, CSF leak/collection, urinary tract infection, deterioration of deficit, and death. Here, we present a postoperative case of an 11-month-old child with cervical meningocele who had an unusual complication almost 2 h after an uneventful surgery in the form of sudden cardiorespiratory arrest was revived successfully.

**Conclusion:** A meningocele surgery is usually not associated with severe postoperative complications which can be encountered in meningomyelocele surgery. Here, in our case, the child with uneventful meningocele surgery arrested 2 h postsurgery with the possible cause being cervical cord edema. Hence, a lesson was learned that strict vigilance is also required in postoperative care for meningocele patients.

**Keywords:** Cardiorespiratory arrest, Cervical meningocele, Hydrocephalus

## BACKGROUND

Spina bifida cystica preferentially affects the lower regions of the spine and is rarely seen in the cervical region. They have been published as isolated case reports in the literature and very little is known about the postoperative complications. Clinical presentation of meningocele is usually a soft cervical mass without marked neurological impairment at the time of diagnosis. External features of the cervical lesion are tubular protuberances at the back of neck covered at the base and most of the cylindrical wall by full-thickness skin and on the dome by thick squamous epithelium.

## CASE REPORT

An 11-month-old male child was posted for cervical meningocele excision of redundant sac with simple skin closure in the neurosurgery operation theater (OT) of our institute. The patient

had come with the complaints of soft swelling of around 3 cm × 3 cm over the nape of the neck since birth which was expansile in nature. There were no other complaints, the patient's neurological examination was unremarkable and the patient was neurologically intact. Preoperative magnetic resonance imaging (MRI) of brain + whole spine of the patient showed the meningocele at C2C3 region [Figure 1]. On the day of the surgery, after confirming the nil per oral status, the patient was taken up inside the OT. A routine induction was done with intravenous (i.v.) propofol 18 mg and i.v. atracurium 5 mg, the patient was intubated with 4.5 mm uncuffed endotracheal tube and was maintained on oxygen, nitrous oxide, and sevoflurane to achieve a minimum alveolar concentration of 1. The surgery was carried out in prone position and was uneventful. Intraoperatively, sac with the neck was defined, the redundant sac was excised, neck closed with primary skin closure. The patient's vitals were stable throughout the surgery. The patient was reversed with i.v. Glyco 20 mcg plus neostigmine 0.5 mg after the confirmation of tetralogy of Fallot (TOF) % of 90%, extubated and was shifted to postanesthesia care unit (PACU) at around 10:40 am.

The patient was conscious and responding. Supplementary oxygen was provided through Ventimask. On arrival, the patient's heart rate was 110 beats/min, SpO2 was 100%, the blood pressure was 90/46 mmHg, and the shifting EtCO2 was 37 mmHg. At around 12:30 pm, the patient developed sudden tachycardia of around 205 beats/min followed by bradycardia with fall of heart rate up to 30 beats/min within few seconds followed by asystole. The patient became unresponsive at the same time. Cardio pulmonary cerebral resuscitation (CPCR) was initiated immediately with chest compressions and bag and mask ventilation. Inj. adrenaline 100 µg bolus was given. The patient was revived after one cycle of CPCR. The patient was intubated, ventilated and was shifted for a computed tomography (CT) brain. The CT brain did not show any significant findings [Figure 2]. The patient regained consciousness, but was sedated and electively ventilated for 2 days. The patient had 4/5 power in all four limbs in immediate postoperative period. Inj. dexamethasone 0.75 mg QID i.v was given for 3 days post the event. The patient was hemodynamically stable throughout the postoperative period and maintained the blood pressure of 80–90/40–50 mmHg which was very crucial to maintain the cord perfusion. The neurological status improved in 3 days and the patient was weaned of the ventilator over 3 days. The patient was extubated on the 3rd postoperative day after meeting all the extubation criteria. A postoperative MRI was planned to confirm the diagnosis of cord edema but could not be done as the patient's parents did not give consent for the same, and the patient was discharged against medical advice on the 5th postoperative day without any neurological deficit. The patient was followed up at 3 months with no neurological deficit or any sequelae of the

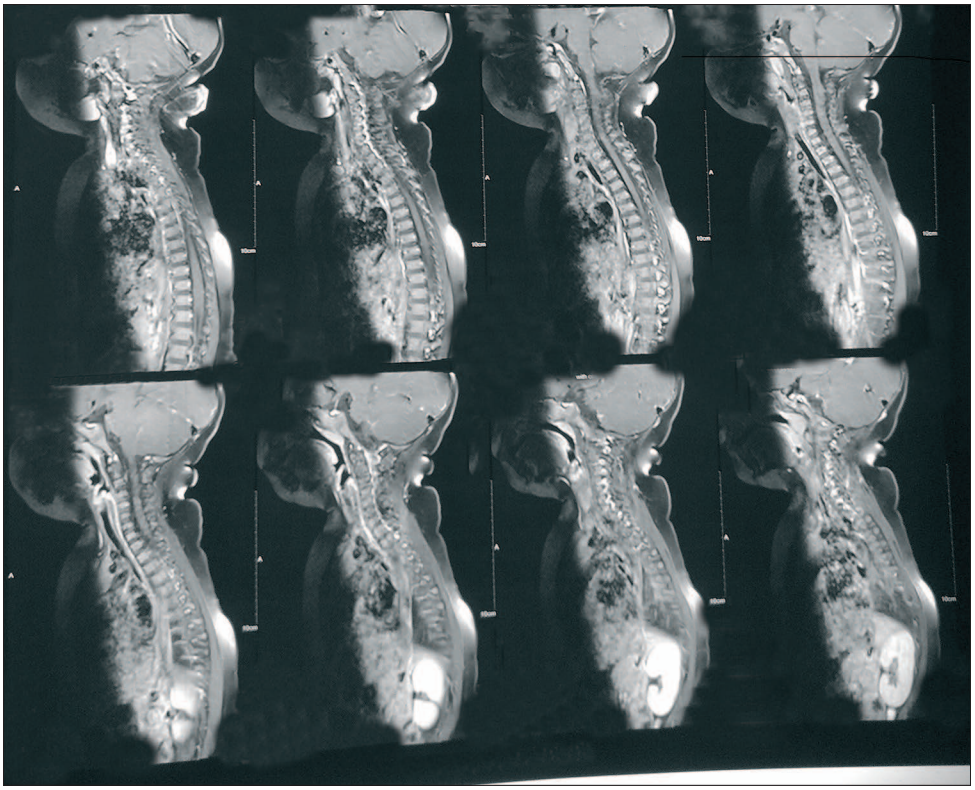

**Figure 1:** Preoperative magnetic resonance imaging brain + spine showing cervical meningocele.

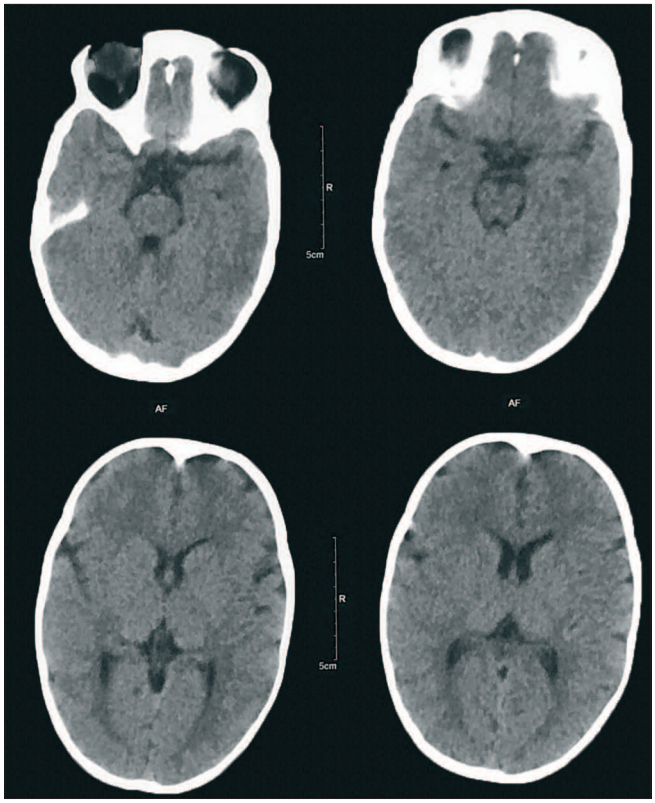


**Figure 2:** Computed tomography scan brain postoperative.

event telephonically as the patient did not come for routine follow-up.

## DISCUSSION

Spinal dysraphism is an uncommon condition reported in 30-40/100,000 live births.[5] Cervical meningoceles are rare spinal dysraphism, accounting for approximately 7% of all cystic spinal dysraphisms.[7] Spinal dysraphism is the most frequent congenital malformation in neonates that require surgical intervention.[4] There are differences in the classification of cervical spinal dysraphism cases. These can be listed as follows: limited dorsal myeloschisis, limited dorsal myeloschisis stalk, myelocystocele, fibroneurovascular stalk, myelomeningocele, and meningocele.[6,8,9]

Meningocele is usually a soft cervical mass without marked neurological impairment at the time of diagnosis. External features of the cervical lesion are tubular protuberances at the back of neck covered at the base and most of the cylindrical wall by full-thickness skin and on the dome by thick squamous epithelium. It is recognized as a sac, which contains cerebrospinal fluid (CSF), neuroglial or fibrous tissue, formed as a result of herniation of the dura structure of the spinal midline defect, while myelomeningocele is recognized as a central sac, which contains neuroglial structures or a meningocele with a medulla spinalis.[1-3] Complications associated with meningoceles range from learning disabilities, seizures, and bowel dysfunction to complete paralysis below the level of the lesion. The postoperative complications reported are wound infection, CSF leak/collection, urinary tract infection, deterioration of deficit, and death and are rare. Here, we present a postoperative case of an 11-month-old child with cervical meningocele who had an unusual complication almost 2 h after an uneventful surgery in the form of sudden cardiorespiratory arrest. The patient was operated for excision of redundant sac with simple skin closure. The differential diagnosis of electrolyte disturbances, incomplete reversal leading to hypoxic arrest, hydrocephalus, postoperative hematoma, brainstem herniation, acute traumatic central cord syndrome (ATCCS), cervical cord edema, and coning was made, though more common with meningomyelocele and less likely to be seen in a case of meningocele surgery.

After resuscitation and stabilization, an arterial blood gas was done which did not show any electrolyte abnormalities, so the differential of electrolyte abnormality was ruled out. The patient was then immediately wheeled in for a CT brain with spine, which did not show any signs of hydrocephalus, raised intracranial pressure, brain stem herniation, or surgical site bleed, so these possibilities as a cause of deterioration were also ruled out. The possibility of inadequate reversal was very unlikely as the patient deteriorated after almost 2 h and the TOF was 90% on shifting to PACU. The differential of ATCCS looked unlikely as there was no hyperextension done at any time during surgery and there was no inciting trauma as well. Hence, the most probable diagnosis of cervical cord edema was made after ruling out other probable differentials. The possibility of a cervical cord handling was also put to question as after discussing with the neurosurgeon, we were assured that there was no spinal cord handling intraoperatively which could have been the case if it was a meningomyelocele. Hence, the definitive diagnosis of cardiac arrest is unclear, especially as it was within hours of surgery and anesthesia delivery. There is very scarce literature available regarding the postoperative complications associated with meningocele. We failed to find any report of a similar incident in the literature. Usually in a meningocele surgery, we do not expect any postoperative complications as in the case with meningomyelocele where there are various complications that can happen which have been mentioned above. Hence, one usually fails to anticipate the possible severe complications that can take place even in the case of meningocele. This case was an eye-opener for the fraternity at our institute regarding the standard operating procedures to be followed even in a case of a relatively uncomplicated meningocele surgery.

## CONCLUSION

A meningocele surgery, i.e. excision of redundant sac with simple skin closure is usually not associated with severe

postoperative complications which can be encountered in meningomyelocele surgery. Here, in our case, the child with uneventful meningocele surgery arrested 2 h postsurgery with the possible cause being cervical cord edema. Hence, a lesson was learned that strict vigilance is also required in postoperative care for meningocele patients.

### Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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