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Case Report

# INCIDENTAL CHIARI 1 MALFORMATION - YET ANOTHER INTRA-OPERATIVE CAUSE FOR BRADYCARDIA: A CASE REPORT

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**ABSTRACT**

Chiari 1 malformation is characterized by descent of cerebellar tonsils through the foramen magnum. Most patients are asymptomatic or may present with non-specific symptoms. We present a case of 13 years old incidentally detected to have Chiari 1 malformation and developed significant bradycardia in the intra-operative period.

**Keywords:** Hiari 1 malformation, Bradycardia, Positioning under anesthesia.

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## INTRODUCTION

Chiari malformations are a group of deformities affecting the posterior fossa and the hindbrain. Chiari 1 malformation is the least severe form characterized by a caudal descent of the cerebellar tonsils through the foramen magnum [1]. Most patients are asymptomatic and the tonsillar descent is incidentally picked up on imaging [1,2]. We report a case of a 13-year-old boy with incidentally detected Chiari 1 malformation who developed significant bradycardia under general anesthesia.

## CASE REPORT

A 13-year-old boy with a lymphovenous malformation of the left cheek was posted for excision under general anesthesia. The child was incidentally detected to have tonsillar herniation below foramen magnum up to 6 mm on the magnetic resonance imaging (MRI) when his lymphovenous malformation of the face was being imaged. He had no symptoms of headache, visual, and balance disturbances. He had no neurological deficits. Neurosurgical consultation was sought and clearance was obtained for surgery. Excision of the cheek lesion was undertaken under general anesthesia. Nasotracheal intubation was done as the surgical team required access to the hard palate during excision.

General anesthesia was induced with propofol, fentanyl, and atracurium to facilitate endotracheal intubation. Oxygen and nitrous oxide mixture in the ratio of 1:1, and isoflurane was used for maintenance of anesthesia. The operating surgeon required the child's head to be slightly extended to facilitate surgery. The child was positioned with slight head extension with a pillow under the shoulder to extend the head and neck. Intra-operatively, there was an episode of transient sudden bradycardia (96 to 70 bpm) with hypotension (120/70 to 73/40 mmHg). The shoulder bag was removed immediately. Without any other pharmacological intervention, the heart rate spontaneously rose to 90 bpm. Thereafter, the procedure proceeded in an uneventful manner.

## DISCUSSION

Chiari type 1 is the least severe of the Chiari malformations and often found incidentally [1,2]. It is the most common type and occurs in a proximately 0.5–3.5% of the general population. Under-development of the skull bones and reduced volume of the posterior fossa leads to displacement of the cerebellar tonsils through the foramen magnum. Most patients with Chiari 1 may be asymptomatic or may present with non-specific symptoms [1,2]. Excessive flexion or extension of the head can cause further descent of the brainstem and there can be bony compression [3].

Our patient was asymptomatic and his malformation was detected incidentally when he underwent MRI for the lymphovenous malformation of the face. The patient was positioned with mild head extension (using a pillow under the shoulder and a small pillow and head ring under the head) to facilitate surgery as per the surgeon's request. About half an hour into the surgery, the sudden bradycardia could have been due to some pressure on the patient's head while the surgeon was operating leading to compression of the neural structures at the foramen magnum. Being aware of his Chiari 1 malformation, we had informed the surgeon that hyperextension and excessive flexion could be dangerous and that we may have to revert the head to neutral position at any point in the surgery.

The heart rate fell to about 70 bpm from 96 bpm and the blood pressure dropped to 73/40 mmHg. We acted swiftly and asked the surgeon to pause the surgery and normalized the head extension. This brought back the heart rate to normal.

Ghasemi *et al*. reported a case of a lady with Chiari 1 malformation with hypertension and bradycardia unresponsive to medication but resolved after neurosurgical intervention [4]. There has been another report by Selmi *et al*. of a patient with symptomatic bradycardia who had a pacemaker insertion and was later diagnosed to have cerebellar ectopia [5]. Surgical intervention relieved the bradycardia in this patient as well.

There have been no previous reports of asymptomatic patients developing bradycardia due to position under anesthesia and surgery. However, extra vigilance may be required when an asymptomatic patient is being positioned under general anesthesia. Neural structure compression at the foramen magnum could be yet another cause of intra-operative bradycardia in such patients.

## CONCLUSION

There have been no previous reports of asymptomatic patients developing bradycardia due to position under anesthesia and surgery. However, extra vigilance may be required when an asymptomatic patient is being positioned under general anesthesia. Neural structure compression at the foramen magnum could be yet another cause of intra-operative bradycardia in such patients.

**CONSENT FOR PUBLICATION**

Informed written consent was taken from the patient's guardian and assent from the patient for publication.

**AUTHORS CONTRIBUTION**

*Amrutha Bindu Nagella* – Conduct of the case, manuscript preparation; *Soumithra Datta* - Conduct of the case, manuscript preparation; *Bhuvana Reddy* - Conduct of the case, manuscript preparation; *Adithya R* - Conduct of the case, manuscript editing; *Varsha R* - Conduct of the case, manuscript editing; *Prabha Parthasarathy* - Conduct of the case, manuscript editing.

**CONFLICTS OF INTEREST**

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