

# Dyspnea Associated with Vocal Cord Paralysis and Type-2 Chiari Malformation

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## ABSTRACT

The etiology of vocal cord paralysis is highly variable. Neurological, birth trauma, surgical procedure and idiopathic are notable causes. Clinical findings are different according to type of paralysis. Vocal cord paralysis can be seen unilateral or bilateral. Bilateral vocal cord paralysis are more severe clinical findings than according to unilateral paralysis. We report a 9-month child. He was admitted to hospital with stridor and cyanosis He was diagnosed Chiari malformation type 2 and bilateral vocal cord paralysis. Chiari malformation type 2 related vocal cord paralysis can severely respiratory failure.

**Key words:** Laryngeal paralysis, Chiari malformation, child

## Vokal Kord Paralizi ve Tip-2 Chiari Malformasyonu ile ilişkili Dispne

### ÖZET

Vokal kord paralizi etiyolojisi çok değişkendir. Nörolojik nedenler, doğum travması, cerrahi işlemler ve idiyopatiklik önemli nedenleri arasındadır. Klinik bulgular, paralizi türüne göre değişir. Vokal kordun paralizi tek veya çift taraflı olarak görülebilir. Vokal kordun bilateral paralizisinde tek taraflı duruma göre daha ağır klinik bulgular görülür. Biz stridor ve siyanoz nedeniyle hastaneye yatırılan Chiari tip 2 malformasyonu ve bilateral vokal kord paralizi tanısı alan 9 aylık erkek çocuk sunduk. Chiari tip 2 malformasyonu ile ilişkili vokal kord paralizi ciddi solunum yetmezliği yapabilir.

**Anahtar kelimeler:** Laringeal paralizi, Chiari malformasyonu, çocuk

## INTRODUCTION

Chiari malformation is a displacement of posterior fossa structures through the foramen magnum (1). Its etiology is not known clearly. The etiology of vocal cord paralysis is quite varied. The notable causes are neurological, birth trauma, surgical procedure and idiopathic (2). In this report, vocal cord paralysis associated with Chiari type 2 malformation in the respiratory failure has been diagnosed in a 9-month-old child.

## CASE

A 9-month-old boy was admitted stridor, cyanosis and dyspnea. He was born spontaneous by vaginal delivery

at normal time. The parents was not consanguineous. He had been operated meningomyelocel at 7-day-old. His physical examination appeared slightly cyanotic and stridor. His weight was 7.3 kg, length was 63 cm and head circumference was 42 cm. Heart rate was 170/min, respiratory rate was 65/min and blood pressure was 105/60 mmHg. His temperature was 36.7°C. We could not find any pathologic findings at other systemic examinations. In laboratory; haemoglobin 11.2 g/dL, white blood cell count 9.500/mm<sup>3</sup> and platelet count 326.000/mm<sup>3</sup>. Serum electrolyte levels were normal. Blood and urine culture were negative. Chest X-ray was normal. He was consulted with an ear nose throuth specialist, bilateral vocal cord paralysis was diagnosed. He was hospitalized to this unit and tracheostomy was

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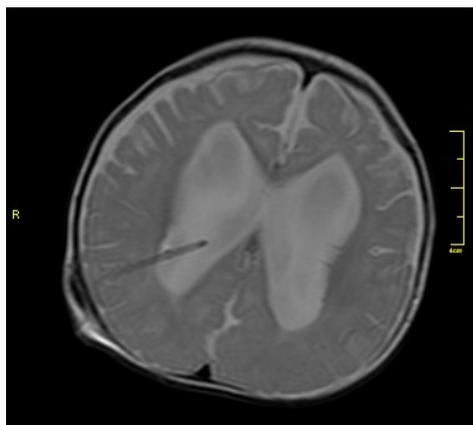
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**Figure 1.** Tracheostomy was performed in pediatric emergency center

performed quickly (Figure 1). He progressed respiratory failure during the postoperative period. Mechanical ventilation was carried out. Vancomycine (40 mg/kg/day divided 4 dosas) and cephotaxim (200 mg/kg/day divided 3 dosas) was started. He was consulted with neurosurgery department. Brain magnetic resonance imaging (MRI) showed hydrocephaly (Figure 2). Both the third and the lateral ventricle were dilated. The posterior fossa was smaller than normal volume. The cerebellum was located lower and wrapped the brainstem. The corpus callosum was thinner than normal size. Ventriculoperitoneal shunt was placed by neurosurgery department (Figure 2). Patient was accepted vocal cord



**Figure 2.** Brain MRI with hydrocephaly and ventriculoperitoneal shunt placement

paralysis associated with Chiari type 2 malformation in the respiratory failure. He remained 28 days in the pediatric care unit. Insufficient of oxygen was performed regularly in time. The patient discharged with home oxygen treatment by using oxygen device.

## DISCUSSION

Chiari malformation is classified according to the severity of displacement and accompanying cranial nerve and cervical pathologies. In type 1 malformation cerebellar tonsillar herniation is the main finding and occurs in adults. In type 2 malformation, there is caudal displacement of medulla and 4. ventricle in addition to this finding. Distorsion and elongation is common. In type 3, cerebellum and brainstem is extended into the meningoencephalocel. In type 4 Chiari malformation, cerebellum and brainstem are hypoplastic (2).

The diagnosis of Chiari malformation is based on neuroimaging. MRI investigation before operation is recommended in order to obtain exact anatomical information. It is treated by surgically. The diagnosis of laryngeal paralysis may be made with, direct laryngoscopy, laryngeal ultrasound, and also with flexible fibronasopharyngolaryngoscopy (FNL). Direct laryngoscopy allows good visualization but we should be careful when positioning the laryngoscope so that it does not cause immobilization of the vocal cord. FNL has the advantage of using only topical anesthesia. Hoarseness is a main complaint, affecting patient satisfaction and postoperative activities (3). Our patient was consulted with an ear nose through specialist, bilateral vocal cord paralysis was diagnosed.

Clinical findings are different according to type of paralysis. Bilateral paralysis of the vocal cord there are higher sever clinical findings than unilateral one. Vocal cord paralysis can be seen as unilateral or bilateral. The use of FNL was suggested because of allowing early diagnosis of vocal cord paralysis and definition of intervention as early as possible (4). Considering bilateral vocal cord paralysis, the main causes are neurological. Among them, hydrocephaly, Chiari malformation and meningomyelocel is the most common. Rosin et al. (5) reported that the clinical findings of bilateral paralysis are: stridor 76%, cyanosis 48%, difficulty in feeding 48% and apnea 41%. Vocal cord paralysis frequently seen unilateral however in our case there was bilateral vocal

cord paralysis. Our patient had been stridor, cyanosis and dyspnea. Our patient was hospitalized to this unit and tracheostomy was performed quickly.

Tracheal intubation is another cause of vocal cord paralysis. Despite advances in intubation techniques and devices. There is a danger of vocal cord paralysis and vocal cord dysfunction. The relation between prolonged intubation and an increased risk of vocal cord immobility and injury was clear (6). Placement of the tracheal tube is thought to immobilize the vocal cords and muscles and paralyse the peripheral nerves (7). There are several possible mechanisms for the causal relationship between prolonged intubation and vocal cord paralysis. One of them is that acute inflammation and ulceration in the larynx result in pathologic changes that may induce vocal cord immobility. Another mechanism is ischaemic neuronal degeneration due to the cuff pressure of tubes. Kikura et al. (8) had found (0.077%) suffered vocal cord paralysis due to tracheal intubation and all such complications occurred within 30 days after surgery. In the same study, they reported that the risk of vocal cord paralysis was found to be increased three-fold in patients ages older than 50 year, fifteen-fold in patients whose intubated for 6 hr or more (8). At prior, Our patient had bilateral vocal cord paralysis. Our patient progressed respiratory failure during the postoperative period. Mechanical ventilation was carried out.

Our aim is to emphasize the importance of vocal cord paralysis associated with Chiari type 2 malformation in the respiratory failure. So that the pediatricians must be attentive to this condition.

## REFERENCES

1. Aydın S, Hanimoğlu H, Tanrıverdi T, Yentur E, Kaynar MY. Chiari type 1 malformations in adults: a morphometric analysis of the posterior cranial fossa. *Surg. Neurol* 2005; 64: 237-41.
2. Greer M. Structural malformations, In L.P. Rowland (ed.), *Merritt's Neurology*, 11th ed. Lippincott Williams Wilkins, Philadelphia 2005 p. 587-601.
3. Wu CL, Berenholtz SM, Pronovost PJ, Fleisher LA. Systematic review and analysis of postdischarge symptoms after outpatient surgery. *Anesthesiology* 2002; 96: 994-1003.
4. Daya H, Hosni A, Bejar-Solar I, Evans JNG, Bailey M. Pediatric vocal fold paralysis: a long-term retrospective study. *Arch Otolaryngol Head Neck Surg* 2000; 126: 21-5.
5. Rosin DF, Handler SD, Potsic WP, Wetmore RF, Tom LW. Vocal cord Paralysis in children. *Laryngoscope* 1990; 100: 1174-9.
6. Santos PM, Afrassiabi A, Weymuller EA. Risk faktörs associated with prolonged intubation and laryngeal injury. *Otolaryngol Head Neck Surg* 1994; 111: 453-9.
7. Wason R, Gupta P, Gogia AR. Bilateral adductor vocal cord paresis following endotracheal intubation for general anaesthesia. *Anaesth Intensive Care* 2004; 32: 417-8.
8. Kikura M, Suzuki K, Itagaki T, Takada T, Sato S. Age and comorbidity as risk factors for vocal cord paralysis associated with tracheal intubation. *Br. J. Anaesth* 2007; 98: 524-30.