



FUSION OF UPPER AND LOWER SEGMENTS WITH ANTERIOR CERVICAL HEMIVERTEBRAL RESECTION: CASE REPORT

ANTERİÖR SERVİKAL HEMİVERTEBRANIN ÇIKARILMASI İLE BİRLİKTE BİR ÜST VE BİR ALT SEGMENTİN FÜZYONU: OLGU SUNUMU

Yunus ATICI¹,
Mehmet Bülent BALİOĞLU¹,
Deniz KARGIN¹,
Akif ALBAYRAK¹,
Gizem İLVAN²

¹Metin Sabancı Baltalimanı
Training and Research Hospital,
Orthopedic and Traumatology
Clinic, İstanbul

²Metin Sabancı Baltalimanı
Training and Research Hospital,
Anesthesiology and Reanimation,
İstanbul

SUMMARY

Hemivertebrae are relatively rarely seen in cervical vertebrae compared to thoracic and lumbar vertebrae. Hemivertebrectomy in the cervical region is more difficult and more complicated than in other regions, due to differences in the anatomical structure. Early diagnosis and treatment of these deformities helps to minimize the risk of surgery and to allow better correction of the deformities. The aim of this case study is to evaluate a 5-year-old patient who had C6 hemivertebra resection and fusion of the upper and lower segments with an anterior approach.

Key words: cervical hemivertebrae, congenital cervical scoliosis, cervical hemivertebrae resection

Level of evidence: Case report, Level IV

ÖZET

Hemivertebr; servikal bölgede, torakal ve lomber bölgelere göre daha nadir görülmektedir. Servikal bölgede hemivertebrrektomi diğer bölgelere göre anatomik yapı farklılığından dolayı daha zor ve daha komplikedir. Bu deformitelerin erken dönemde tanı ve tedavisi, cerrahi riski minimize eder ve deformitenin daha iyi düzelmesine izin verir. Bu vaka sunumunda 5 yaşında C6 hemivertebraya sahip olan hastanın anterior girişimle hemivertebrasının eksizyonu ile birlikte bir üst ve bir alt segmentin füzyonu sunulmaktadır.

Anahtar kelimeler: Servikal hemivertebr, konjenital servikal skolyoz, servikal hemivertebr çıkarılması

Kanıt düzeyi: Olgu sunumu, Düzey IV

Address: Dr. Yunus Atıcı,
Metin Sabancı Baltalimanı Eğitim
ve Araştırma Hastanesi, Ortopedi
ve Travmatoloji Kliniği, Spine
Disease Surgery and Prosthesis
Surgery Group, Baltalimanı,
Sarıyer/İSTANBUL
Tel.: 0505 4921945
E-mail: yunatici@hotmail.com
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INTRODUCTION:

For congenital cervical scoliosis with a cervical hemivertebra, although *in situ* fusion of the deformity can be a preferred surgical option without correction, another surgical option in the literature is deformity correction and fusion of the adjacent vertebra after removal of the hemivertebra^{2,4}. However, it should be noted that caution should be taken with this procedure, as it is a complex method with associated complications.

The aim of this case study is to emphasize the application of an anterior plate after anterior excision and correction for cases with a diagnosis of scoliosis with an early cervical hemivertebra.

CASE REPORT:

A 5-year-old female patient was admitted to our clinic

due to limitation of motion in the neck, and curving of the head to the left. The patient had clinical signs such as a tilt to the left, shortness of the neck, a short hairline at the nape, differences in the level of the scapula and a right shoulder width that was less than the left. The clinical landscape of the patient was compatible with Klippel-Feil syndrome. Congenital pseudoarthrosis was detected in the right clavicle. Orthorontgenograms, MRI and 3D tomography were taken of the patient. There were C6 cervical and T4 hemivertebrae on the right in direct anteroposterior and lateral cervicothoracic radiographs of the patient. At the same time, the C2–3–4 vertebral corpuscles were block vertebrae, with a partial defect formation of the posterior vertebral elements in the cervical region between C1–6 in the central region. There was cervicothoracic kyphoscoliosis depending on the congenital vertebral anomaly in the patient (Figures-1-3).

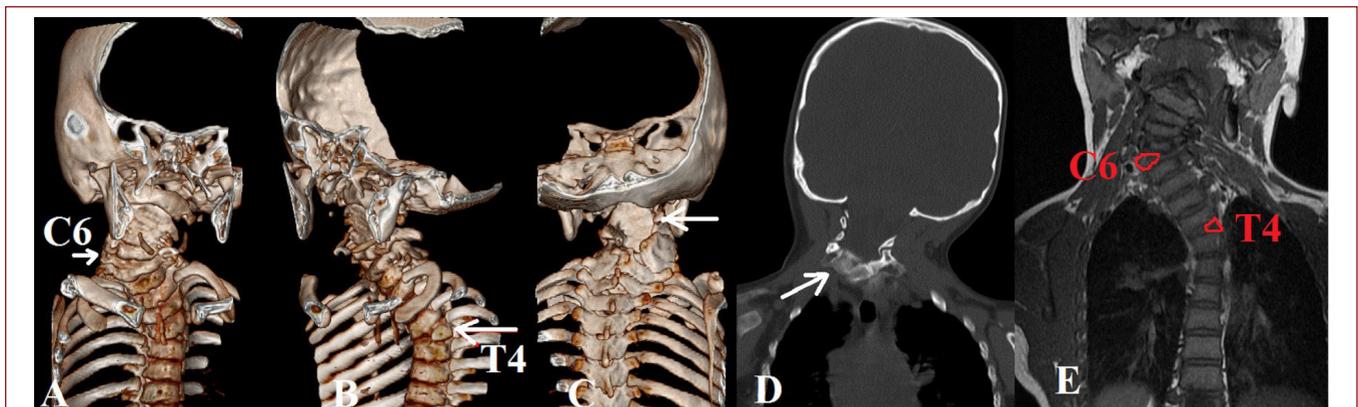


Figure-1. a) 3-CT image of C6 hemivertebra, b) 3-CT image of T4 hemivertebra, c) 3-CT image of posterior defect in posterior elements between C1–6, d) Coronal CT image of C6 hemivertebra e) Coronal MRI of C6 and T4 hemivertebrae.

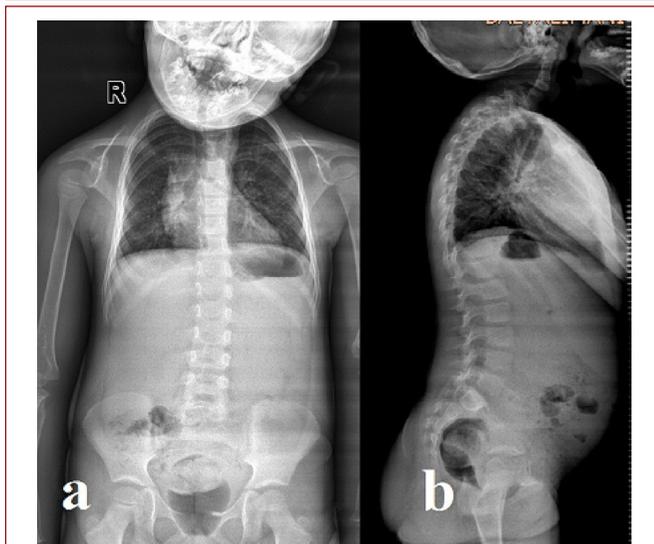


Figure-2. a) Preoperative anteroposterior X-ray
b) Preoperative lateral X-ray



Figure-3. Preoperative images

SURGICAL TECHNIQUE:

Hemivertebrectomy with an anterior approach alone was applied to the C6 cervical hemivertebra of the patient. There was no need for a posterior approach because there was no defect formation in the posterior elements of the hemivertebra. In a supine position, the right cervical hemivertebra was reached from the anterior of the sternocleidomastoid muscle from the right. The borders of the hemivertebra were determined by applying discectomy to the places adjacent to the hemivertebra. With the help of a high-speed diamond bur, the posterior and lateral walls of the hemivertebra adjacent to the remaining medulla spinalis were removed after the majority of the hemivertebra was excised. At this point, the vertebral artery was preserved with a dissector. The roots were preserved with root retractors after

controlling the foramina with a root hook. After removal of the left partial disc at the C5–7 level, correction of the neck tilt and scoliosis was performed by placing a PEEK cage filled with an autograft in this region. The aim was to obtain fusion by detecting the C5–6 vertebrae with an anterior plate screw system. Then, the patient was laid in a prone position and entered between the T3–5 vertebrae with a posterior incision. Between the T3–5 vertebrae, fusion and instrumentation with posterior screws were performed without hemivertebrectomy (Figures-5,6).

During surgery, spinal cord monitorization was carried out. No pathologies developed during or after surgery.

The patient was mobilized by performing cervicothoracolumbar orthosis one week after surgery. Orthosis use was terminated after two months of use.

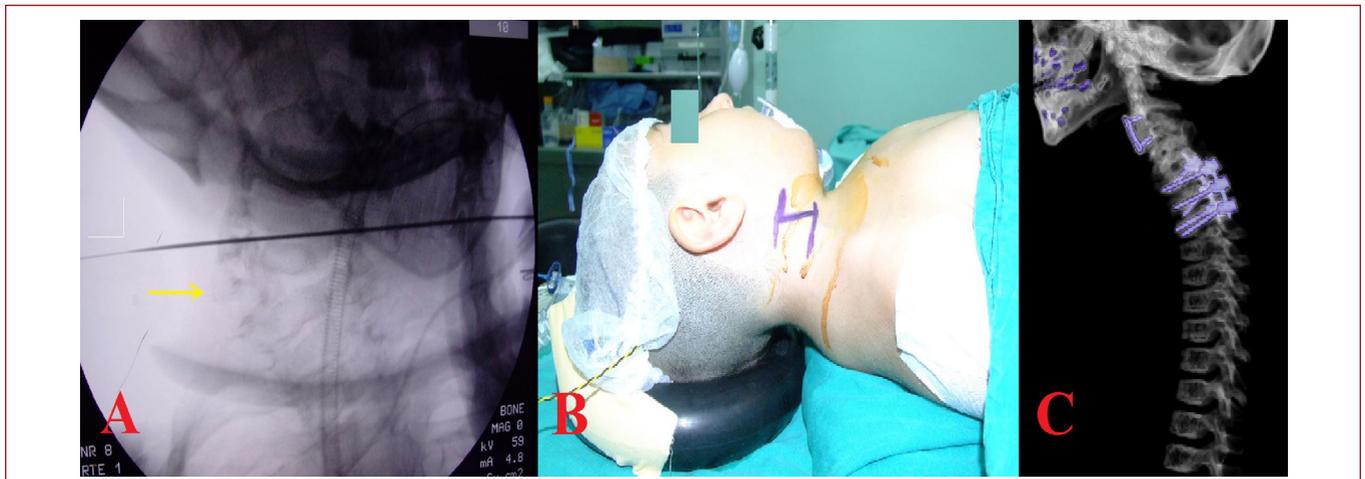


Figure-4. a) and b) The detection of the incision site during the operation, c) 3-CT image after the operation

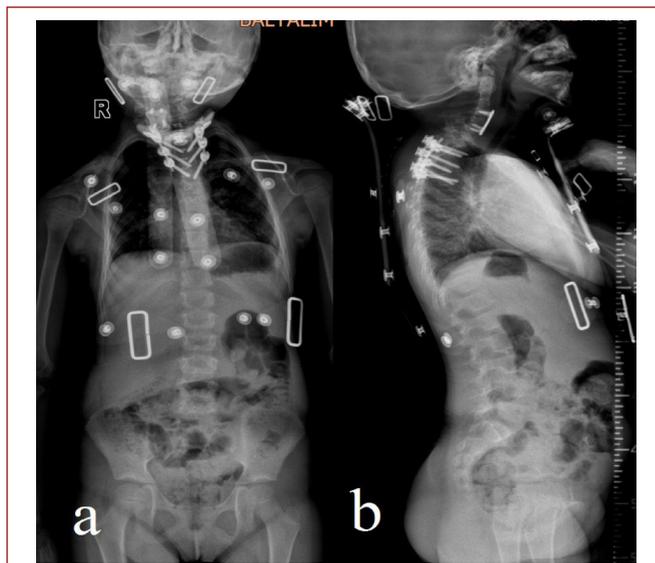


Figure-5. a) Postoperative anteroposterior X-ray, b) Preoperative lateral X-ray

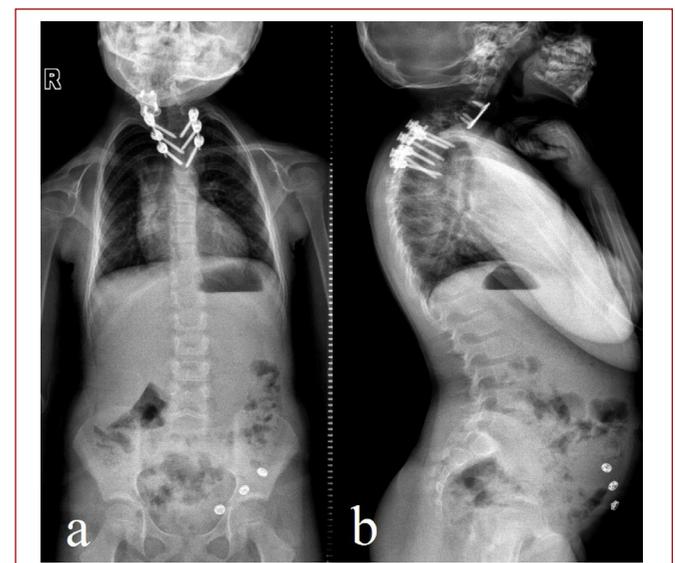


Figure-6. a) Anteroposterior X-ray 5 months after the operation, b) Preoperative lateral X-ray



Figure-7. Postoperative images

RESULT:

The operation time was 260 minutes and the blood loss was 650 ml. The preoperative Cobb angle of the scoliosis was 48° in the cervical region and 36° in the upper thoracic region. The postoperative Cobb angle of the scoliosis was 21° (56% correction) in the cervical region and 11° (69% correction) in the thoracic region. After five months of follow-up, the Cobb angle of the scoliosis was 22° in the cervical region and 9° in the thoracic region (Figure-7). The head tilt to the left was measured as 18° preoperatively, 5° postoperatively, and 6° at further follow-up. There were no complications in the patient.

DISCUSSION:

Hemivertebrae in the cervical region are a rarely-seen pathology when compared to the thoracic and lumbar regions. Other organ and vertebral anomalies can be often associated. The most commonly associated vertebral anomaly is a block vertebra in the cervical region, the presence of a hemivertebra in the thoracic region, and congenital scoliosis in the thoracolumbar region^{1,4,5}. Organ anomalies that can be associated are medullospinal, cardiovascular and renal pathologies¹. In our case, there was a cervical block vertebra, a hemivertebra in the thoracic region, and syringomyelia in the medulla spinalis.

Families bring children with cervical hemivertebrae to clinics due to symptoms such as limited movement of

the neck, a tilt of the head, torticollis, or an associated curve of the back³.

A hemivertebra in the cervical region in the early period can cause severe deformity in later periods.

An increase in cervical scoliosis will cause an increase in the tilt of the head. Therefore, this causes compensatory scoliosis in the upper thoracic region to make the eye gaze horizontal. If there are no flexible structures in the thoracic region (due to fusion or a congenital anomaly), the balance will be maintained by developing a shift in the body^{1,2}. In the late period, degenerative arthritis and instability can develop in adjacent hypermobile segments with age. The development of these pathologies can cause pain and neurological symptoms³. Any surgical approaches performed at this stage will be complicated.

Removal of a hemivertebra from the cervical region is more difficult than in the thoracic and lumbar regions. Anterior and posterior approaches are required for the complete resection of a hemivertebra from the cervical region. Successful correction of the scoliosis and head tilt will be provided with this technique. During surgery, the spinal cord should be prepared by carefully protecting the nerve roots and vertebral artery⁴. In this case, there was no need for a posterior approach due to the partial lack of posterior elements.

In the literature^{2,4}, although there have been no large case series with resection of a cervical hemivertebra, Ruf et al. stated that they obtained successful results of the correction of local deformity and head tilt in their study that included three cases⁴. They suggested that these cases should receive surgery in the early period, before compensatory changes in the upper thoracic region or asymmetry of the head occur.

In our case, we obtained a significant correction rate of the scoliosis and head tilt after cervical hemivertebra resection. We conclude that better correction of the head tilt and deformity can be obtained by preferring hemivertebra resection to *in situ* fusion.

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