Posterior Hemivertebra Resection in Congenital Spinal Deformities

Thesis

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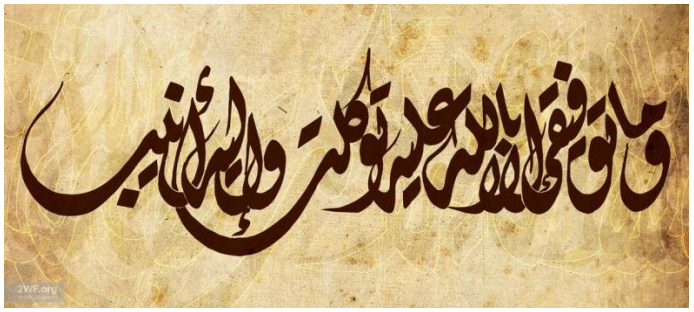

صدق الله العظيم

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✍ ***Mahmoud Ahmed Hussein Ashour***

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List of Abbreviations

Abb.	Full term
3D	Three Dimensional
AP	Antero-posterior
CSF	Cerebrospinal fluid
CSVL	Central Sacral Vertical Axis
CT	Computed Tomography
EOS	Early onset scoliosis
Fig	Figure
HMMS	Hemimetameric shift
LIV	Lower instrumented vertebra
MAGEC	Magnetic Expansion Control
MCGR	Magnetically controlled growing rods
MRI	Magnetic Resonance Imaging
NO	Number
PA	Postero-anterior
PJK	Proximal junctional kyphosis
PRBCs	Packed red blood cells
PXRs	Plain X-rays
RA	Regional angulation
ROM	Range of motion
SD	Standard deviation

Abb.	Full term
SVA	Sagittal Vertebral Axis
TIS	Thoracic insufficiency syndrome
UIV	Upper instrumented vertebra
UMNL	Upper motor neuron lesion
VAS	Visual analogue scale
VEPTR	Vertical Expandable Prosthetic Titanium Rib

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Introduction

Congenital vertebral malformations generally occur in early embryonic life (before 7weeks), and are caused by disorders in formation or segmentation of the spinal segments that originate from primitive mesenchymal condensations of embryonic cells.[1]

Complete failure of formation leads to hemivertebra with the absence of one pedicle and a region of the vertebral body, while incomplete failure of formation leads to a wedged vertebra.[2]

Hemivertebrae could be fully segmented, partially segmented and unsegmented.[3]

McMaster and David found that the degree of spine deformity produced depends on four factors: first, the type of hemivertebra; secondly, its location; thirdly, the number of hemivertebrae and their relationship with each other; and finally, the age of the patient. [4]

As many as 61% of patients with congenital scoliosis may have abnormalities affecting other organ systems. Anomalies may appear independently or as part of a syndrome, such as the VATER syndrome (vertebral anomalies, anorectal atresia, tracheoesophageal fistula,

renal and vascular anomalies). The noted association of cardiac and limb defects (eg, radial clubhand, thumb hypoplasia) has led to an expansion of the acronym from VATER to VACTERL. Because the spine, genitourinary tract, musculoskeletal system and cardiovascular system all develop during similar times, an embryonic insult may affect one or all of these systems. Defects in one system should prompt evaluation of the others.[5]

Conventional radiography often is difficult to interpret because of the patient's small size, the complex nature of the deformity, superimposed structures obscuring visualization of the anomaly. Advanced imaging with 3D computed tomography (CT) has been used to simplify interpretation and to show pedicular anatomy and bony anomalies thus helpful in preoperative evaluation and planning. Magnetic resonance imaging (MRI) is needed to exclude neural axis abnormalities (eg, spinal dysraphism).[6]

Hemivertebra resection can be done via combined anterior and posterior or posterior only surgery.[7] With the development of the pedicle screws technique, hemivertebra resection can be performed successfully with only a posterior approach using a one-stage procedure. This can be performed with an excellent outcome.[8]

Aim of the Work

This prospective study is conducted to evaluate the results of posterior only resection of hemivertebrae in congenital spinal deformities.