Clavicular Autograft for C7–T1 Anterior Spinal Fusions

Enxerto clavicular autólogo para artrodese cervical anterior de C7–T1

Edmundo Luis Rodrigues Pereira1,2  Daniella Brito Rodrigues3  Mário de Nazareth Hermes Júnior4

1 Hospital Metropolitano de Urgências e Emergências, Belém, PA, Brazil  
2 Deapartment of Neurology, UniversidadeFederal do Pará, Belém, PA, Brazil  
3 Universidade do Estado do Pará, Belém, PA, Brazil  
4 Hospital Metropolitano de Urgências e Emergências, Belém, PA, Brazil

Address for correspondence Edmundo Luis Rodrigues Pereira, MD, Universidade do Estado do Pará, Rua dos Pariquis, 1838, ap. 802, Jurunas, Belém, PA, Brazil CEP: 66033-590 (e-mail: eluis@ufpa.br).


Abstract

Background  Arthrodesis to anterior cervical spine fusion (ACSF) following trauma remains an effective method to accomplish both vertebrae link and neural decompression using combined materials such as metal screws and plates, along a section of bone inserted between the two adjacent involved vertebrae plates, conferring reliable spinal stability. Present study shows an alternative technique using autologous ipsilateral clavicle bone graft to fracture disruptions localized at most inferior aspect of cervical spine.

Methods  Five adult patients with C7–T1 fracture dislocations were treated by means of clavicular autograft to promote neural decompression and vertebral fusion. An anterior cervical supramanubrial approach was performed in all patients to perform a standard surgical approach and dissection to the anterior cervical spine.

Results  No gross injury was found to adjacent structures, the middle one-third of the clavicle offered sufficient bone for the one to two segments fused with the remaining bone for at least two additional segments, and a convenient bone healing fusion was observed 3 to 6 months after the procedure, without local or regional complications from the technique.

Conclusion  Autologous clavicle may be a suitable alternative to the iliac crest for use in anterior cervical fusion procedures with a convenient bone healing fusion.

Keywords  ► cervical vertebrae  
► column  
► arthrodesis  
► spinal fractures

Palavras-chave  ► vértebras cervicais  
► coluna  
► artrodese da coluna vertebral  
► fraturas

Resumo

Introdução  A artrodese de coluna cervical é um método eficaz para fixação vertebral e para descompressão neural, utilizando materiais como parafusos, placas de metal e um enxerto ósseo inserido entre as duas placas fixadas nas vértebras adjacentes, conferindo estabilidade para a coluna vertebral. O presente estudo mostra uma técnica alternativa que utiliza enxerto ósseo autólogo da clavícula ipsilateral a fraturas localizadas no segmento mais inferior da coluna cervical.

Métodos  Cinco pacientes adultos com fraturas e luxações de C7-T1 foram tratados por meio de enxerto clavicular autólogo, com o intuito de promover a descompressão.
Introduction

Anterior cervical fusion (ACF) with iliac bone graft is a suitable technique used to provide spinal stability and neural decompression. Despite the safety of the procedure, a small group of patients suffers from undesired complications, mainly persistent pain on donor site. Here we present an alternative to lower cervical spine fusion using clavicle bone graft instead, which revealed satisfactory results in the middle-term postsurgical follow-up.

Materials and Methods

Five adult patients (three men and two women, 23–40 years old) harboring C7–T1 fracture dislocations were treated by means of clavicular autograft to promote neural decompression and vertebral fusion. All patients were victims of traffic accidents, harboring no others injured sites, but ‘ASIA A’, according ASIA Impairment Scale (AIS) as the predominant preoperatively physical examination.

An anterior cervical supramanubrial approach was performed in all patients by means of a semicurved transverse skin incision above the left clavicular superior border to perform a standard surgical approach and dissection to the anterior cervical spine.

Lateral extension of incision was performed to gain further access to clavicular region, where a bone graft of approximately 2.5 cm was removed from the middle one-third of the clavicle (Fig. 1), followed by a standard discectomy and corpectomy, with placement of harvested ipsilateral clavicle previously dissected (Fig. 2), and an anterior cervical plating system was next placed over the segment using standard techniques.

The harvested clavicle as well as clinical and radiologic results were analyzed during the procedure, in the next day following surgery, and in postoperative follow-up of 01, 03, 06, and 12 months.

Fig. 1 Donor site of clavicular autologous bone graft.

Fig. 2 Clavicular bone graft inserted between C7–T1.
Patient should be counseled regarding these potential problems, and alternative sources of graft material should be considered in all instances. Other graft sources for cervical fusion procedures include synthetic materials and donor grafts, but considering the data that autologous bone grafts seem to generate the best results for fusion, the next logical step is to seek alternative donor sites so as to attempt to reduce the morbidity associated with these procedures.  

Autologous clavicle has not been properly explored as a potential source for cervical fusion, which may be reasonable considering anatomical proximity of the anterior cervical approach, mainly to treat lesions located at the inferior aspect of cervical spine, mainly the C6–C7 and C7–T1 vertebral segment.  

We performed autologous clavicular bone graft in five patients harboring C7–T1 lesions during anterior cervical spinal fusion procedures, with no local or systemic complications, no significant extend on surgical time, gaining a satisfactory degree of fusion on middle-term follow-up, revealing that this may be also a suitable bone graft site of utility in such types of injuries.

**References**