دراسة مقارنة بين وضع قفص عنقى أو شريحه عظميه بعد إستئصال الغضروف العنقى من الأمام

توطئة للحصول على درجة الماجستير فى جراحة المخ والأعصاب

مقدمه من الطبيب

حسين عاطف البقيعي

بكالوريس الطب والجراحة

تحت إشراف

الأستاذ الدكتور/ عماد محمد غانم

أستاذ جراحة المخ والأعصاب
كلية الطب- جامعة عين شمس

الاستاذ الدكتور/محمد توفيق حسني

أستاذ جراحة المخ والأعصاب
الاكاديميه الطبيه العسكريه
مستشفي المعادي للقوات المسلحه

الدكتور/ احمد فيصل طوبار

استاذ مساعد جراحة المخ والأعصاب
كلية الطب- جامعة عين شمس

2013

`

COMPARATIVE STUDY BETWEEN CERVICAL CAGE AND BONE GRAFT APPLICATION AFTER ANTERIOR CERVICAL DISCECTOMY

Thesis

Submitted for partial fulfillment of master degree
in Neurosurgery

By
HUSSIEN ATEF ELBAKEEI
(M.B,B.Ch.,)

Supervised by

Prof. Dr. EMAD MOHAMED GHANEM
Professor of Neurosurgery
Faculty of medicine
Ain Shams University

Prof. Dr. MOHAMED TAWFIK HOSNEY
Professor of Neurosurgery
Military medical academy
Maadi armed forces hospital

Assis. Prof. Dr.AHMED FAISAL TOUBAR
Assistant Professor of Neurosurgery
Faculty of medicine
Ain Shams University

2013

هُوَ ٱللَّهُ ٱلَّذِى لَآ إِلَٰهَ إِلَّا هُوَ ۖ عَٰلِمُ ٱلْغَيْبِ وَٱلشَّهَٰدَةِ ۖ
هُوَ ٱلرَّحْمَٰنُ ٱلرَّحِيمُ ﴿٢٢﴾ هُوَ ٱللَّهُ ٱلَّذِى لَآ إِلَٰهَ إِلَّا هُوَ
ٱلْمَلِكُ ٱلْقُدُّوسُ ٱلسَّلَٰمُ ٱلْمُؤْمِنُ ٱلْمُهَيْمِنُ ٱلْعَزِيزُ
ٱلْجَبَّارُ ٱلْمُتَكَبِّرُ ۚ سُبْحَٰنَ ٱللَّهِ عَمَّا يُشْرِكُونَ
﴿٢٣﴾ هُوَ ٱللَّهُ ٱلْخَٰلِقُ ٱلْبَارِئُ ٱلْمُصَوِّرُ ۖ لَهُ ٱلْأَسْمَآءُ ٱلْحُسْنَىٰ ۚ
يُسَبِّحُ لَهُۥ مَا فِى ٱلسَّمَٰوَٰتِ وَٱلْأَرْضِ ۖ وَهُوَ ٱلْعَزِيزُ ٱلْحَكِيمُ ﴿٢٤﴾

Acknowledgment

First and last of all , thanks to the merciful ALLAH .

I would like to express my deepest thanks, appreciation and gratitude to ***Prof. Dr. EMAD MOHAMMED GHANEM,*** *Professor of neurosurgery, Ein Shams University, for his support, encouragement, continuous help, guidance and valuable supervision.*

I would like to express my deep gratitude and my warm thanks to ***Prof. Dr. MOHAMMED TAWFIK HOSNEY,*** *Professor of neurosurgery, military academy and head of neurosurgery department in Maadi military hospital for his encouragement and support. He was always kind enough to give the push in performing this work.*

I am also deeply indebted and thankful to assistant ***Prof. Dr. Ahmed Faisal Toubar*** *Professor of neurosurgery, Ein Shams University, for his kind help, guidance and meticulous supervision.*

I would like to express my deep gratitude and my warm thanks to the staff members of neurosurgery department in Maadi military hospital for the great help and support they gave to me, specially the one I consider my godfather.

And before and after my great gratitude and warm thanks to my very best and great father, such lovely mother , brothers and my whole family.

HUSSIEN ATEF

2013

Contents

List of figures

fig(13-14) C.T. myelography of cervical spine at atlas and c6 level

Fig(15)M.R.I. saggital view T1

Fig (16) M.R.I axial view T2,c6/7 protruded inter-vertebral disc

Fig(17) **Dermatomal pattern**

Introduction

The spine is a mechanical structure. The vertebrae articulate with each other in a controlled manner through a complex system of levers (vertebrae) , pivots (facets and discs), passive restraints (ligaments) and activators (muscles) .

Degenerative disc and ligamentous diseases of the cervical spine are thought to represent anatomic adaptation to the continuous wear and tear of the involved structures. This process leads to structural changes in the involved joints, with thickening and calcification of the ligaments and appositional bone formation. Cervical spondylosis is a commonly used term to describe these degenerative changes and has been defined as vertebral osteophytosis secondary to degenerative disease.

. M.R.I. is the most sensitive imaging modality in depicting cervical disc herniation and neural compression.It is the best method for evaluating a patient with radiculopathy or myelopathy, features of a cervical disc herniation include extension of nuclear material beyond the posterior margin of the vertebral body .

Surgery is indicated in failure of a 3-month trial of conservative methods of treatment to relieve persistent or recurrent radicular arm

pain with or without neurologic deficit . Neuro-radiographic findings must be consistent with the clinical signs and symptoms , and the duration and magnitude of symptoms must be sufficient to justify surgery**.**

Anterior cervical discectomy and fusion with an autogenous iliac bone graft is the standard treatment for cervical disc herniation.To decrease bone graft-related problems , several types of interbody fusion cage have been developed and are used widely in clinical practice **.** Interbody fusion cages are hollow implants that restore physiological disc height , allowing bone growth within and around them , thus stimulating bone fusion .

Aim of work

To compare clinical and radiological outcome of using either a cage or a bone graft for cervical interbody fusion after anterior cervical discectomy .

Introduction

The spine is a mechanical structure. The vertebrae articulate with each other in a controlled manner through a complex system of levers (vertebrae) , pivots (facets and discs), passive restraints (ligaments) and activators (muscles)

(Bernhardt et al.,2006) .

Instability could be kinematic occurring during motion, component occurring due to structural damage, or both . Kinematic instability is due to increased motion, alteration in the instantaneous axis of rotation , change in coupling characteristics, or presence of paradoxical motion . Component instability is secondary to trauma, tumor, surgery , degenerative changes, or developmental changes **(Moskovish., 2001) .**

.

Degenerative disc and ligamentous diseases of the cervical spine are thought to represent anatomic adaptation to the continuous wear and tear of the involved structures. This process leads to structural changes in the involved joints, with thickening and calcification of the ligaments and appositional bone formation. Cervical spondylosis is a commonly used term to describe these degenerative changes and has been defined as vertebral osteophytosis secondary to degenerative disease (**Jackson and Gokaslan., 2004) .**

Radiculopathy is characterized by pain radiating to the arm in dermatomal distribution with or without sensory and/or motor changes. Cervical spondylotic myelopathy (CSM) is spinal cord dysfunction (development of long tract signs) as a result of degenerative changes at the cervical motion segment producing compression of the spinal cord (**Rao., 2006) .**

X-ray imaging studies should start with anteroposterior and neutral lateral view radiographs as well as flexion-extension views if there is any evidence of instability or listhesis and is also useful to know how much motion is occurring . Axial C.T. images through degenerative cervical discs are especially useful for the depiction of osteophytes which are readily apparent on bone window images as rough and irregular bony excrescences from the vertebral body margin . Posterior osteophytes extend into the central canal and may be seen contacting and deforming the adjacent cord **(Rao., 2006) .**

. Sagittal C.T. reconstructions will assist in visualizing this effect. Posterolateral osteophytes compromise the lateral foramina. M.R.I. is the most sensitive imaging modality in depicting cervical disc herniation and neural compression.It is the best method for evaluating a patient with radiculopathy or myelopathy, features of a cervical disc herniation include extension of nuclear material beyond the posterior margin of the vertebral body **(Rowe . , 2009) .**

Surgery is indicated in failure of a 3-month trial of conservative methods of treatment to relieve persistent or recurrent radicular arm pain with or without neurologic deficit .

Neuro-radiographic findings must be consistent with the clinical signs and symptoms , and the duration and magnitude of symptoms must be sufficient to justify surgery (**Jenis et al., 2004) .**

Anterior cervical discectomy and fusion with an autogenous iliac bone graft is the standard treatment for cervical disc herniation , however autologous bone grafts obtained from the anterior iliac crest are associated with significant donor site morbidity and complications . To decrease bone graft-related problems , several types of interbody fusion cage have been developed and are used widely in clinical practice **.** Although the early results with the cages were satisfactory , problems such as migration , subsidence and structural failure of the cage with some difficulties in postoperative magnetic resonance imaging were observed (**Kahraman et al ., 2006) .**

A tricortical iliac crest autograft was the first interbody implant used in the cervical spine **.** Interbody fusion cages are hollow implants that restore physiological disc height , allowing bone growth within and around them , thus stimulating bone fusion . They have been developed to prevent disc space collapse and its relevant clinicoradiological consequences , as well as the donor-site morbidity reported in conjunction with autologous bone graft procedures **.** The main advantages of interbody cage assisted fusion include , immediate restoration and maintenance of disc height and the height of the foramen , the reduced risk of subsidence , better immediate stabilization of the segment , earlier bone fusion , prevention of kyphosis, ease of use and low morbidity

(**Barlocher et al . , 2008) .**

Aim of work

To compare clinical and radiological outcome of using either a cage or a bone graft for cervical interbody fusion after anterior cervical discectomy .

Patients and Methods

-Study design

A comparative retrospective study of a clinical series of 20 patients with degenerative cervical disc treated by an anterior cervical discectomy procedure and either fusion using cage alone or iliac bone graft alone . Twenty cases were operated and evaluated over a period of 2 years .

-Patients and Evaluation

Twenty patients with degenerative disc disease were randomly assigned to two groups of patients (A , B) and treated at Ain Shams University Hospitals and Maadi Armed Forces hospital by anterior cervical discectomy and fusion using cage alone or bone graft alone.

-Inclusion criteria

Degenerative disc disease within levels between C3-C7 at one or two levels causing , Neck pain and / or brachialgia , neurologic deficit (radiculopathy or myelopathy) or progressive pain / neurologic deficit .

- Age between 25-70 years, failure of conservative treatment for more than 6 weeks.

-Surgical procedure

Surgical procedures were carried out using the common anterolateral approach . The posterior osteophytes and any sub-ligamentous fragment were removed using the microscope to ensure adequate neural decompression . Gentle decortication of the endplates was performed with a drill or curette. Interbody fusion is achieved using an autologous bone graft or cervical cage .

-Postoperative Outcome assessment

A-Clinical outcome:

Especially noting sensory disturbance and motor weakness compared with the pre-operative status .

Functional outcome: was assessed according to Odom's criteria. It was defined as :

-Excellent outcome, good outcome, satisfactory outcome or poor outcome .

Patient satisfaction: with postoperative results , is evaluated using a patient satisfaction index (PSI) . This index is a modified subitem of the North American Spine Society outcome questionnaire . It is scored as very satisfied , satisfied , unsatisfied or very unsatisfied .

B - Radiological outcome include:

A - Plain X-rays of the cervical spine lateral (neutral)

Patients radio graphs were reviewed to determine fusion.

A five –pointrating scale was used, with operative levels considered:

Fused with bridging trabeculae, fused with perigraft lucency , not fused with atrophy / lucency , not fused with motion or indeterminate .

A patient was considered to have a successful fusion if all operative levels received a radiographic rating of 1 or 2 **.**

B – MRI or C T of the cervical spine

It is done for patients not improving or with persistent postoperative complaint or any new neurologic deficit . All patients were followed at regular intervals (1 month , 3 months, 6 months, and 1 year) including a clinical and radiological evaluation (as explained above) .