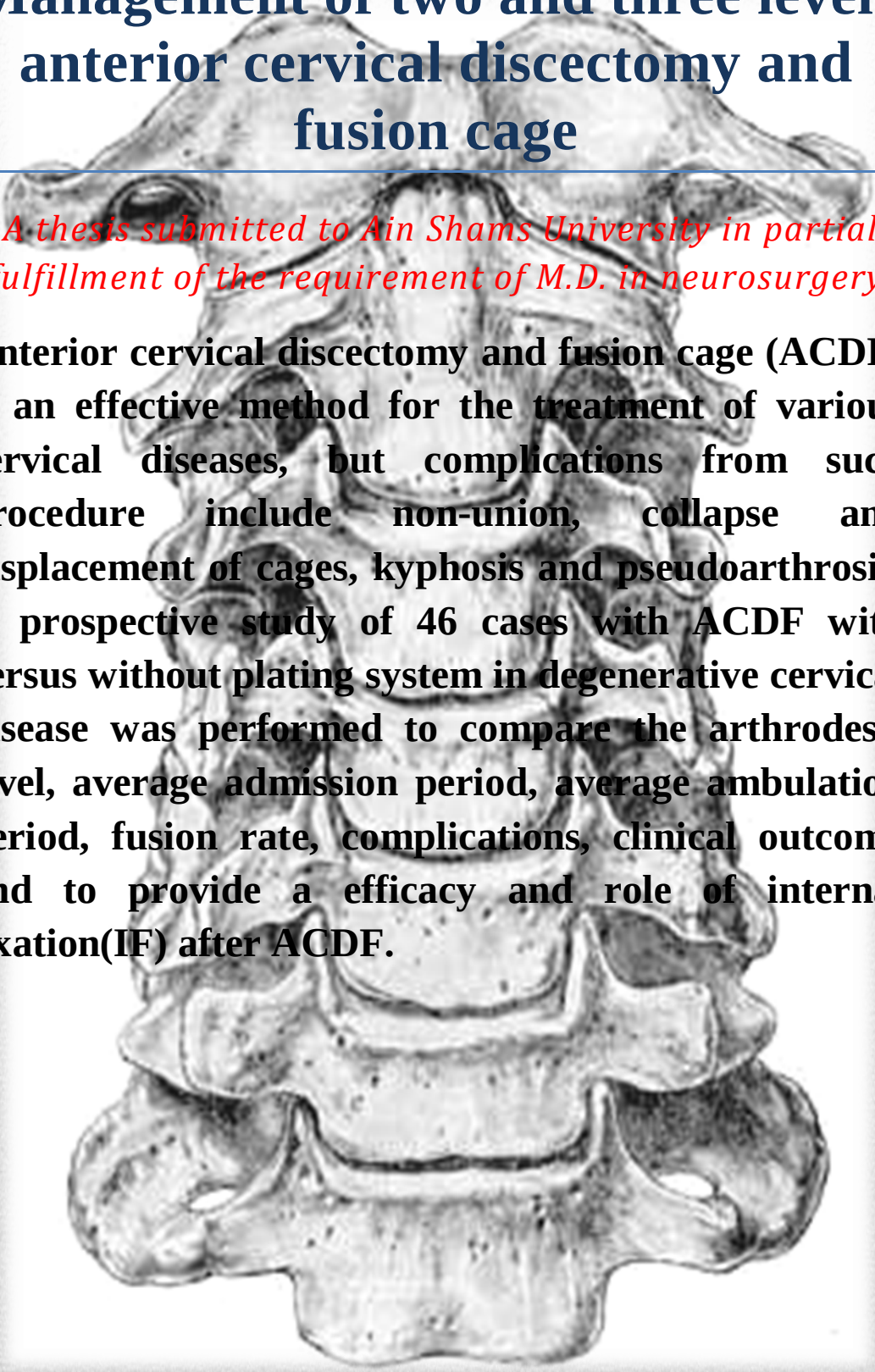
Role of Anterior Cervical Plating in Management of two and three levels anterior cervical discectomy and fusion cage

A thesis submitted to Ain Shams University in partial fulfillment of the requirement of M.D. in neurosurgery



Anterior cervical discectomy and fusion cage (ACDF) is an effective method for the treatment of various cervical diseases, but complications from such procedure include non-union, collapse and displacement of cages, kyphosis and pseudoarthrosis. A prospective study of 46 cases with ACDF with versus without plating system in degenerative cervical disease was performed to compare the arthrodesis level, average admission period, average ambulation period, fusion rate, complications, clinical outcome and to provide a efficacy and role of internal fixation(IF) after ACDF.

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By

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2012

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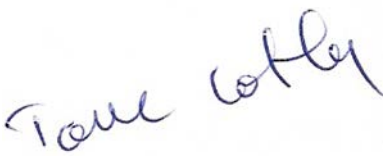

Dr. Hazem Ahmed Mostafa
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2009

دور شريحة تثبيت الفقرات العنقية من الأمام في جراحات الإستئصال الأمامي للغضروف العنقي المنزلق ثنائي و ثلاثي المستويات مع إلتحام الفقرات بواسطة الأقفاص العنقية

خطة بحث علمية

توطئة للحصول على درجة الدكتوراة فى جراحة المخ و الأعصاب

مقدمة من

الطبيب/ مصطفى محمود فوزى غرابه

ماجستير الجراحة

كلية الطب-جامعة عين شمس

تحت إشراف

الأستاذ الدكتور/ محمد سيد إسماعيل

أستاذ جراحة المخ و الأعصاب

كلية الطب- جامعة عين شمس

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أستاذ مساعد جراحة المخ و الأعصاب

كلية الطب- جامعة عين شمس

الدكتور/ حازم أحمد مصطفى

أستاذ مساعد جراحة المخ و الأعصاب

كلية الطب- جامعة عين شمس

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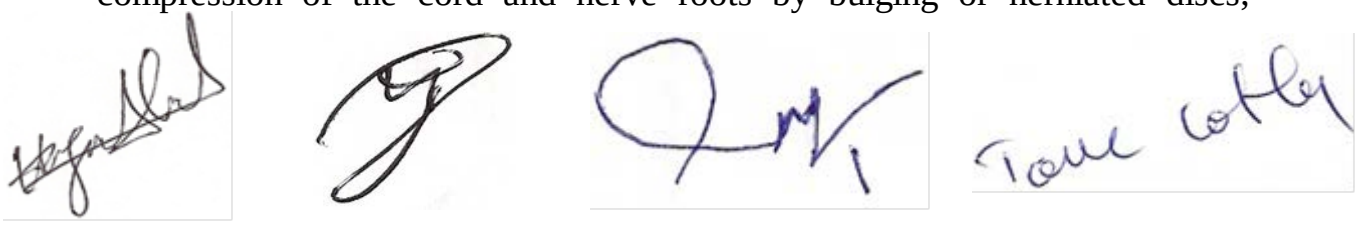
Introduction

Patients with cervical spine- related problems can be systematically approached by dividing their presentations into axial neck pain, radiculopathy, myelopathy, or some combination of these three groups.Axial neck pain refers to pain along the spinal column and its related paraspinal musculature. Cervical radiculopathy is characterized by pain radiating into the arm, which may be accompanied by sensory and/ or motor changes in a radicular distribution. Cervical spondylotic myelopathy is the development of long tract signs as a result of long stay compression on the cervical spinal cord 4.

The natural history of these conditions suggests that for the most part of patients with axial symptoms are best treated without surgery; whereas some patients with radiculopathy will continue to be disabling by their pain and may be candidates for surgery. Patients presenting with moderate to severe myelopathy will likely benefit from surgical intervention in an attempt to alter the natural history of the disease process, the major goal of surgery in this sitting is to halt the progression of the disease. Improvements in motor, sensory, and gait dysfunction are desirable but they are clearly secondary goals of surgical decompression 11.

Patients with multiple cervical discs most probably presented by cervical myelopathy, which can be treated surgically by anterior or posterior decompression. The exact mechanism of neurological damage from spondylotic myelopathy is unknown, but both direct neural compression and diminished blood flow have been suggested as potential causes. Direct compression of the cord and nerve roots by bulging or herniated discs,



spondylotic bars, and/or uncovertebral osteophytes occurs on the anterior surface of the neural elements. So direct decompression of the cord and nerve roots can only be accomplished with an anterior approach 10.

Anterior cervical discectmy and fusion, as originally reported by Robinson7, is a highly successful procedure for the treatment of neural compression caused by disc material or osteophytes; however, the incidence of nonunion and graft collapse rises with increase in the number of segments to be fused. The anterior approach allows direct visualization of the entire interspace and wide decompression of the anterior aspect cervical spinal cord and nerve roots; it may be undertaken in cases of multilevel diseases, and interbody fusion may be performed if required9.

Cloward1 first described the anterior approach as an option for cervical disc herniation and cervical spondylosis in cases in which iliac crest bone graft fusion was performed. The Cloward fusion procedure has undergone several technical modifications and there is now no consensus regarding the best technique. The various advantages and the types of morbidity associated with the different procedures are still debated in literature 8.

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 autologus bone graft procedures. The primary complications related to the implantation of fusion cages are subsidence into the adjacent vertebral bodies, cage dislocation, nonunion-related instability, and painful pseudarthrosis 6.

According to the literature, fusion rates decrease significantly in multilevel surgery and some authors recommend the addition of plate system to improve the results 2, 3, 5.



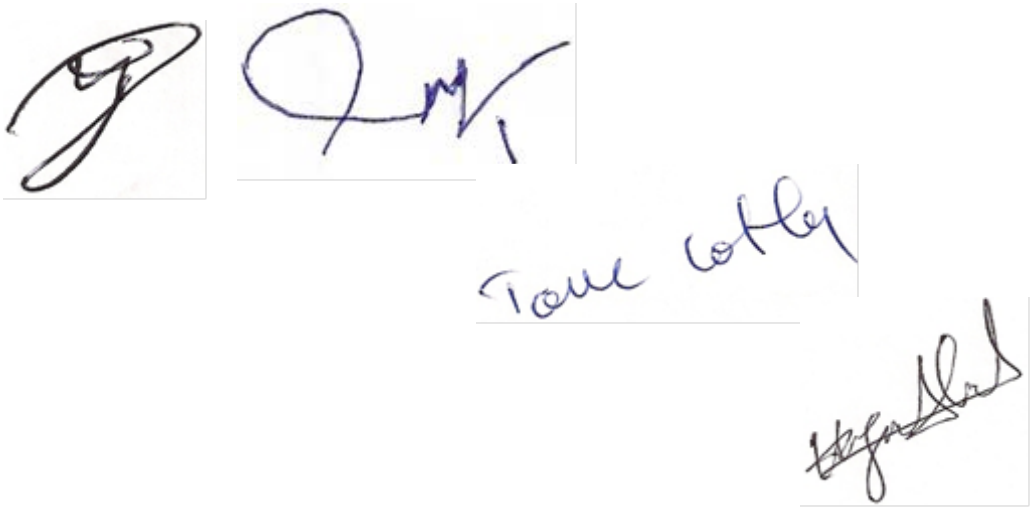

Material and Methods

A prospective review will be conducted on a 46 patients aged from 30-60 years who complain of radiculopathy and/or radiculomyelopathy due to degenerative cervical discs prolapse not relived by conservative treatment so will be surgically treated. There will be 2 main groups of patients, group (A) consist of 26 patients have two levels cervical discs herniation, 13 of them treated by two levels PEEK anterior cervical discectomy and fusion (ACDF) with rigid locked anterior cervical plate and the other 13s without plating, group (B) consist of 20 patients have three levels cervical discs herniation, 10 of them treated by three levels PEEK (ACDF) with rigid locked anterior cervical plate and the other 10s without plating, both groups will be operated by senior authors . The review will focus on operating room time, hospital stay, overall cost, clinical outcome, radiological outcome including plain X-ray and MRI and time to return to normal activities including work.

All the patients will be followed up immediately postoperative and at regular 3 months intervals clinically for a minimum period of one year. At each follow-up, radiographs will be taken to check the proper positioning of implant, disc space height, and maintenance of correction of cervical lordosis. Fusion will be judged by the absence of motion between the fused segments on flexion-extension radiograph, absence of radiolucent gap between PEEK and vertebral endplate, and presence of continuous bridging bony trabeculae at PEEK-endplate junction.

Aim of the work

Comparative study between multiple anterior cervical discectomy and fusion by cages with and without additional rigid locked anterior cervical plate fixation for evaluating the clinical, radiological, and general outcomes of the patients operated in Ain Shams University Hospital And 6th October Insurance Hospital.



Study design

Place of work:-

Ain Shams University Hospital and 6th October Insurance Hospital

Plan of work:-

Half of patients treated surgically by anterior cervical discectomy and fusion cage with locked rigid anterior cervical plate, and the other half without plate. All the patients will be followed up immediately postoperative and at regular 3 months intervals clinically for a minimum period of one year. At each follow-up, radiographs will be taken to check the proper positioning of implant, disc space height, and maintenance of correction of cervical lordosis.

Participant numbers& selection:-

46 patients aged from 30-60 years male and/or female who complain of radiculopathy and/or radiculomyelopathy due to degenerative cervical discs prolapsed not relived by conservative treatment

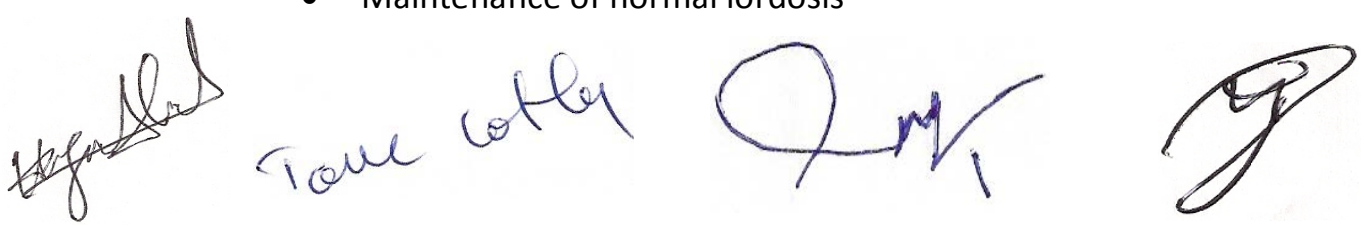
Exclusions of participant:-

- Patients have traumatic cervical disc prolapsed.
- Osteoporotic patients.
- Patients have more than three-level cervical degenerative discs prolapsed.
- Patients aged more than 60 years.

Benefits:-

Benefits to the individual

- Increase fusion rate
- Decrease fusion time
- Maintenance of normal lordosis



- Decrease rate of cage dislodge
- Maintenance of disc space height
- Decrease rate of pseudoarthrodesis

Benefits to the community

- Decrease stay time in hospital
- Early return to work

Risks and complications:-

There is minimal complication from ACDFcage with plating

Alternative to participating:-

Patient can be treated medically if he not wants to be treated surgically or treated surgically by ACDF cage only without plating and this will not lead to great hazards to him.

Right to refuse or withdraw:-

The participant has the right to withdraw from the research at any time without giving any cause, without any hazards.

Whom to contact:-

<u>The main researcher</u>

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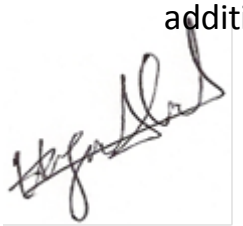
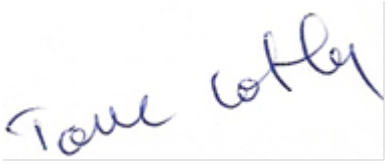
Dr. Hazem Ahmed Mostafa Tel\ 0232336978

Patient informed consent for neurosurgical spinal reconstructive surgery

- Patient Name:……
- Age:……..
- Date:…… Date of Surgery:……..
- I have elected to have the following operation by Dr. Mostafa and his senior authors: ……...
  ……

- For the following diagnosis:……
  ……..

- Dr. Mostafa has explained this operation in full.
- I have had the opportunity to have second opinions offered to me.
- Spine surgery never allows a person to have a normal spine.
- The intent of this surgery is to improve your condition so that you may be able to function better.
- Chronic pain is never desirable but may be present after this surgery.
- Pain improvement of varying percentages is hoped for and attained in most patients.
- No warranty or guarantees have been given that pain or neurological function will return to normal.
- You may have continual pain after surgery and may require additional surgery for the removal of disk, bone or implants at the level of surgery or at another level.
- Rarely some patients are not better after surgery and their condition may worsen.
- If you are having a fusion performed some stiffness will occur and it will be permanent. This stiffness may lead to the deterioration of adjacent levels or disks in your spine over time.
- I have read the surgical hand out given to me. The surgeon may have to alter what is written in the handout at the time of surgery if additional findings are found.

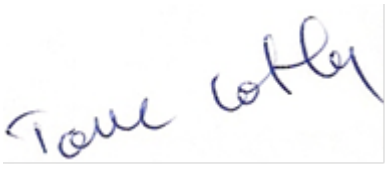



- I understand that the surgeon may have to modify my surgery if additional findings are seen at the time of surgery. I have discussed and directed the surgeon to repair these findings as needed. This may alter the levels of surgery, and it may necessitate a fusion with or without instrumentation.

- The risks of spinal surgery including death, paralysis, nerve damage, spinal cord injury, bleeding requiring a transfusion, infection and possible osteomyelitis requiring further surgery and long term antibiotics, sterility in males, impotence in males, blood clots in the legs requiring anticoagulation, infection, dural tear, spinal fluid leakage, stroke, vascular injury, hardware loosing and pain, scaring of nerve roots after surgery, chronic pain, injury to the major blood vessels, sympathetic pain, degeneration or instability at adjacent or the same levels of surgery, chronic changes in gait, changes in flexibility of the spine, weakness of muscles, chronic numbness, and bleeding into soft tissues causing compression of the nerves called a hematoma requiring emergency surgery.

- Cervical operations have additional risks. Those include the above, and the risks of bleeding into the soft tissues of the neck causing compression of the trachea or breathing tube or nerves requiring emergency surgery, swallowing difficulty, Horners syndrome with visual changes, hoarseness, and scaring.
- These risks have been discussed with me by the surgeon. The surgeon has explained to me the procedure I am having in detail and given me ample time to ask questions about the procedure. I have no further questions, and wish to precede with the surgery.
- Signed or hand stump:……
- Witness:……
- Date:…….. Time…….....






Acknowledgment

First of all I'd like to give my grateful thanks to **ALLAh** for his great care, support and guidance in every step in my life.

I'd like to thank **prof. Dr. Mohammed Sayed Ismail**, Prof. of Neurosurgery, Faculty of Medicine, Ain Shams University, whose fatherly guidance; care and understanding had greatly helped in completion of this work. I'd like to thank him for the kind and religious attitude while dealing with his students and patients.

I'd like to express my since gratitude and appreciation to **prof. Dr. Ismail Hassan Sabry**, Prof of Neurosurgery, Faculty of Medicine, Ain Shams University , for his faithful support during the whole period of this work.

I'm deeply indebted to my supervisor **prof. Dr. Tarek Mohamed Lotfy Salem** Prof. of Neurosurgery, Faculty of Medicine, Ain Shams University, who help, stimulating suggestions, and encouragement helped me in all the time of research for and writing this thesis.

I am highly indebted to **Dr. Hazam Ahmed Mostafa**, Assistant Prof. of Neurosurgery, Faculty of Medicine, Ain Shams for his guidance and constant supervision as well as for providing necessary information regarding the work & also for his support in completing the work.

Apart from the efforts of me, the success of any work depends largely on the encouragement and guidelines of many others. I take this opportunity to express my gratitude to **Dr. Ahmed Hamad**, Assistant Prof. of Neurosurgery, Faculty of Medicine, Ain Shams who has been instrumental in the successful completion of this work. I would like to show my greatest appreciation to hem. I can't say thank you enough for his tremendous support and help. I feel motivated and encouraged every time I attend in his operations. Without his encouragement and guidance this work would not have materialized.

No one walks alone on the journey of life. So finally I'd like to thank my **mother** and my **wife** for their support.