

# Anterior Cervical Decompression and Fusion (ACDF) With Titanium Plate and Screw in Rajshahi Medical College Hospital

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## Abstract:

*Anterior Cervical Decompression and Fusion (ACDF) with titanium plate and screw in Rajshahi Medical College Hospital has established a new era in managing cervical spine injury in Rajshahi Medical College Hospital as well as in the northern quarter of the country. Nine cases with subluxation / dislocation of cervical vertebra following trauma have undergone ACDF with titanium plate and screw during the period of One year from July'09 to June'10 in the Department of Neurosurgery, Rajshahi Medical College Hospital. Every patient was evaluated on admission and after recovery from spinal shock and categorized in grades according to Frankel scale. Mean duration of follow up was 7.8 months. Although preoperative functional status is the best outcome predictor, complete improvement was observed in 44.4% cases. Patients were discharged usually on 7<sup>th</sup> postoperative day again after evaluation in the same scale.*

## Introduction:

ACDF, one of the most common procedures performed by spine surgeons, was first reported in the 1950s. The two most common methods for ACDF were described by Robinson and Smith in 1955 and by Cloward in 1958. Robinson-Smith described an operation for removal of cervical disc material with replacement of a rectangular bone graft obtained from iliac crest to allow for a development of cervical fusion. With Cloward's method, discectomy was performed by a dowel technique. Although numerous modifications have been developed since 1950s, a great majority of spine surgeons currently use either Smith-Robinson or Cloward technique<sup>5,7</sup>.

Cervical myelopathy results from disc prolapses or subluxation/dislocation is the common indication for ACDF /ACD. It can be done only by bone graft and by titanium plate following placement of bone graft. Autologus iliac crest has the highest rate of fusion but can cause significant donor site morbidity.

In order to avoid this morbidity auto graft substitutes have been developed including cadaveric bone, xenografts, synthetic substitutes<sup>5</sup>. We have performed ACDF with titanium plate after placement of autologus iliac crest graft in nine post traumatic cases with cervical myelopathy<sup>1,2</sup>.

Although preoperative functional status is the best outcome predictor, other outcome predictors<sup>3</sup> including age, type of injury, extent of cord compression, time elapsed after trauma to surgery, type of surgery are important in outcome prediction. A rigid cervical collar having potential hazards is essentially needed to be used if ACDF is performed only with bone graft to prevent graft extrusion. The aim of using titanium plate is to prevent prolong use of collar and thus to prevent its complication.

We advised to discontinue collar after 02 weeks of surgery. Our mean duration of follow up was 7.8 months and no sequel was noticed during this period.

## Materials and methods:

This was a prospective study done in 01 year period from July'09 to June'10 in the Department of Neurosurgery, Rajshahi Medical College Hospital. Functional outcome was evaluated using the Frankel scale.

All the patients were male. The youngest patient was of 25 years while the oldest was 55years. Causes include RTA, animal attack and fall from height. The patients were investigated by plain x-ray, MRI and investigations relevant for GA fitness. ACDF with titanium plate was performed in all cases.

## Results:

**Clinical presentations:** Pain (local and radicular) was the most common presenting symptoms in all patients. In addition to pain motor (weakness and spasticity) and sensory disturbances were in 05(55.5%) and 04(44.4%) patients respectively. 02(22.2%) patients develop sphincter disturbance at the time of insult.

**Investigations:** X-ray and MRI of cervical spine and relevant investigations for GA fitness in addition.

**Management:** Cervical traction was given in all patients in order to obtain realignment, decompression and immobilization. In addition general management was provided to all patients. ACDF was performed after a period ranging 02 weeks to 02 months after injury.

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Figure 1: Subluxation of C6



Figure 2: ACDF With titanium plate and screw

**Complications:** There was no post operative mortality or morbidity in this series.

**Functional outcome:** Patients in this series were followed up for an average period of 7.8 months. Complete symptomatic improvement was observed in 44.4% cases. Functional outcome was assessed in Frankel Scale. Preoperatively in Frankel scale, there was 01, 04, 04 in grade C, D, E respectively. four patients were improved by 01 grade, 01 patient was functionally unchanged and there was no deterioration in this series (Table-1).

Table 1 Functional outcome of treated patients

	Early post operative Frankel grade				
	A	B	C	D	E
Preoperative Frankel grade A					
	<b>B</b>				
	<b>C</b>		<b>1</b>		
	<b>D</b>			<b>4</b>	
	<b>E</b>			<b>4</b>	

Figures in the bold reflect the situation where pre and postoperative grading is unchanged

Figures without bold indicate postoperative improvement.

Table-2: Frankel scale for assessing motor/sensory function in spinal injury<sup>3</sup>

Score	Description
A	No motor/sensory function below the level of injury
B	Some preserved sensation below level of injury; this does not apply to slight discrepancy between motor and sensory level, but does apply to sacral sparing.
C	Some preserved motor function below the level of injury, but it is of no practical use
D	Preserved useful motor function below level of injury; patients in this group can walk with or without aids.
E	Normal motor and sensory function; abnormal reflexes may be present

Table-1 Data Complies the Reference of Frankel Scale for assessing motor/sensory function in spinal injury (Table-2)

**Discussion:**

Plating of the cervical spine has its origin in early 1980's for the cervical spine trauma. Since this time, numerous papers have discussed role of plating for ACDF in patients with degenerative disc disease. We have started ACDF with titanium plate and screw in mid of 2009 in patient with post traumatic cervical myelopathy due to subluxation/dislocation of cervical vertebra<sup>7</sup>.

ACDF only with bone bears potential risks of graft extrusion, unstable motion segment during early postoperative period<sup>1</sup>. Use of a rigid cervical collar for long duration is pivotal in ACDF only with bone. However these complications can be avoided in ACDF with titanium plate and screw. There was no graft extrusion in this series.

Initially ACDF only with bone was being practiced in spondylotic myelopathy to prevent pain in early post operative period. Again, there was no pain during early post operative period in this series.

Any surgical procedure carries a certain amount of risk. These risks include, but are not limited to, infection, bleeding, nerve injury and swallowing difficulty.

With this procedure, the fusion may not heal properly and

a second surgery may need to be performed. There are also risks of anesthesia. Although risks exist to this procedure, the complication rate is low. Generally, patients do not require blood transfusion, as blood loss for this procedure is very low<sup>8</sup>.

In the hands of experienced surgeon, decompression and fusion surgery is usually very effective in relieving symptoms of nerve root compression, and in preventing progression of nerve damage from spinal cord involvement. After the patient has healed from fusion procedure, the positive effects of surgery level can last decades<sup>6</sup>.

Conclusion: ACDF is an effective treatment in patients with cervical myelopathy due to subluxation / dislocation following trauma. Because of donor site morbidity cadaveric bone, xenografts or synthetic substitutes is our next consideration.

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