

Complications of Spinal Instrumentation

Dr. Omar Bachh¹, Dr .Mohammad Dawood Bachh², Dr Owais Ahmed wani³, Dr Asma Shah³

^{1,2,3}Senior resident

¹Neurosurgery, GMC, ²Department of Anesthesiology,

³ Internal and Pulmonology Medicine Postgraduate department of Internal and pulmonary Medicine
SKIMS, soura Srinagar

*Corresponding Author:

Dr Owais Ahmed wani

Senior resident

Internal and Pulmonology Medicine Postgraduate department of Internal and pulmonary Medicine,
SKIMS, Soura

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ABSTRACT

174 patients who underwent spinal instrumentation were analyzed from February 2010 to February 2014 . All the patients who underwent surgery were included one of the following groups : **Level of pathology** – cervical ,dorsal ,lumbar **Pathology involved** – degenerative ,traumatic,neoplastic and infective . **Complication** – each patient was analyzed for the post surgical complication which was grouped as major and minor complications. Among 174 patients under the study majority of the patients (67 patients) were of the age group 51-60 years (38.5%). Youngest and oldest being 18 and 83years respectively. Out 174 patient operated for spinal instrumentation 50 patient had either a major or minor complication.Overall incidence of 28.73%.**Major complications** deep wound infection(dwi) 2.9% ,new neurological deficits (nnd) 4.0% ,implant failure (failure) 3.4% , myocardial infarction(mi) 0.6% ,pulmonary embolism(pe) 0.6% , death (d) 5.7% ,tracheostomy(trac) 0.6%.**minor complications** urinary tract infection(uti) 2.3% , dysphagia (dysp) 0.6% , deep vein thrombosis(dvt) 1.1% , pneumonia (pneu) 2.9% ,urinary retention(ur) 1.7% ,excessive blood loss(bl) 4.0% , dural tear (dt) 2.9%..

Keywords: NIL

INTRODUCTION

Introduction This structure i.e. Spinal cord is essential for the transmission of neural signals between the brain and the rest of the body and helps in motor , sensory , autonomic control ⁽¹⁾. When the stability of the spine is compromised ; due to any reason such as trauma , infections , tumours , degenerative conditions , connective tissue disorders , congenital disorders, degenerative disorders, and iatrogenic (postsurgical) etiologies ; resultant effects are morbidity and mortality , hence the importance of and the need for spinal instrumentations arise. In the past three decades, increased understanding of spinal biomechanics, proliferation of sophisticated spinal

instrumentation devices, advances in bone fusion techniques, refinement of anterior approaches to the spine, and development of microsurgical and minimally invasive methods have made it possible to stabilize every segment of the spine successfully, regardless of the offending pathology. Accordingly, use of spinal fusion and instrumentation has increased. The question facing the modern spine surgeon is not so much how to stabilize the spine but when to do so. ⁽¹⁻³⁾ The patients who are identified, are subjected to surgical intervention and then have to further battle the odds, this is where this study plays a part. Patients who undergo spinal intervention

may or may not have a cent percent good outcome, there is always a risk for complications. The goal of treatment of every spinal insult is to achieve maximal restoration of vertebral column, offer better functional outcome and a disability free life for the patient eg: for patients sustaining a spinal column injury, the treatment focus is protecting uninjured neural tissues, maximizing recovery of injured neural tissues and optimizing conditions for the musculoskeletal portions of the spinal column to heal in a satisfactory position. Surgical stabilization of the spinal column can prevent further mechanical and vascular injury to the damaged cord tissue⁽⁴⁻⁹⁾. Operative intervention is intended to convey immediate stability to the spine, allow for the correction of deformities, and optimize neurologic improvement by directly or indirectly relieving any residual impingement of the neural elements. Over the last few decades, a better understanding of spine anatomy, biomechanics and pathology coupled with an explosion of new technology has led to exciting advances in the care of patients with spine disorders. Over the last ten years, minimally invasive surgery (MIS) has been performed with increasing frequency leading to less morbidity and faster recovery. Emphasis has been placed in defining MIS not just by the length of the skin incision, but by the relative sparing of soft tissue trauma which has led to a decrease in intraoperative blood loss, postoperative pain, length of hospital stay, and time to recovery. While spinal fusions have traditionally been a successful way to treat certain conditions of the spine, techniques to retain motion in the spine have also made many advances⁽¹⁰⁻¹⁵⁾. Newer generation artificial disc replacements and techniques to insert mobile implants will hopefully lead to less fusion related complications and more active lifestyles.

The aim of this study is to identify the complications that are associated with spinal instrumentation so that all the factors associated with the patient (preoperatively and postoperatively) are taken into account so as to see the prevalence of the complications and to minimize the same.

Aim and Objectives of study: To Study the complications arising due to the surgical instrumentation of the spine. To study the patients who are undergoing spinal instrumentation based location, pathology associated and surgical

approaches used. To study the incidence of the complications associated with spinal instrumentation.

MATERIALS & METHODOLOGY

Total 174 patients who underwent spinal instrumentation were analyzed from February 2010 to February 2014 in a tertiary care hospital in India. All the patients who underwent surgery were included one of the following groups: **Level of pathology** – cervical, dorsal, lumbar **Pathology involved** – degenerative, traumatic, neoplastic and infective. **Complication** – each patient was analyzed for the post surgical complication which was grouped as major and minor complications.

Major complications included – Deep wound infection, new neurologic deficit, Sepsis, Hardware/graft failure, Myocardial infarction, pulmonary embolism, Death, Tracheostomy **Minor complications included-**

Urinary tract infection, Dysphagia, Deep venous thrombosis, Pneumonia, Urinary retention, Hyponatremia, Excessive blood loss requiring transfusion, Durotomy, Pneumothorax. Data was analysed by reviewing the patients soon after the postoperative period and by going through the medical records and radiographic images.

Surveillance for the complications status consisted of: Physical clinical examination, Laboratory tests, and Serial radiographic studies. All the patients underwent plain radiograph prior to discharge. The patients were regularly followed up after 3 months, 6 months, 1 year and yearly afterwards. Follow up imaging and laboratory tests were done as and when required. **Surgery:** All the patients under the study group underwent surgical intervention with spinal stabilization.

Patients underwent various surgical procedures for degenerative, neoplastic infective and traumatic pathology ranging from micro-discectomy, laminectomy, laminoplasty, corpectomy with decompression of the dural sac and nerve root followed by instrumentation using metal plates, rods, cages, spacers and screws. **Postoperative Assessment:** Detailed clinical and neurological Assessment- Done during postoperative stay in the hospital on a daily basis until discharge and followed up during each visit in the OPD after discharge. Laboratory investigations were done during

postoperative period when ever any complication was suspected specifically based on the complication. Radiological Assessment- Postoperative X-RAY/CT/MRI spine was done on first postoperative day and again prior to discharge. During followup the X-RAY/CT/MRI SPINE done at 3 months. Patients were followed up for a minimum period of 1 year (minimum 4 visits) .

RESULTS: Among 174 patients under the study majority of the patients (67 patients) were of the age group 51-60 years (38.5%). Youngest and oldest being 18 and 83years respectively. Out 174 patient operated for spinal instrumentation 50 patient had either a major or minor complication. Overall incidence of 28.73%. **Major Complications** deep wound infection(dwi) 2.9% ,new neurological deficits (nnd) 4.0% ,implant failure (failure) 3.4% , myocardial infarction(mi) 0.6%, pulmonary embolism(pe) 0.6% , death (d) 5.7% ,tracheostomy(trac) 0.6%. **minor complications** urinary tract infection(uti) 2.3% , dysphagia (dysp) 0.6% ,deep vein thrombosis(dvt) 1.1% , pneumonia (pneu) 2.9% , urinary retention(ur) 1.7% ,excessive blood loss(bl) 4.0% , dural tear (dt) 2.9%.

PATHOLOGY VERSUS COMPLICATION

RATE: Neurological deficits post surgery was maximum in infective pathology -12.5 % , Implant failures were more common in traumatic pathology - 6.45%, and Deep wound infection was common in neoplastic pathology 4.3% . **Approach versus complication rate:** Anterior approach patients had maximum mortality and implant failure rates. Excessive blood loss was common in the posterior approaches compared to the anterior approach – **location versus complication rate:** Patients with the cervical spine pathology had maximum mortality. Likewise new neurological deficits were common in cervical region. Total of 7 patients had excessive blood loss out which 5 patients were operated for lumbar spine

Discussion and conclusion: In this study comprising of 174 patients only 50 cases landed up with complications and majority of these cases were in the age group of 51-60 years. The cases with cervical pathology patients in age group of 81-90 years were found to have the maximum mortality rates , perhaps because of their poor general health condition and poor ability to recuperate. The most common minor

complication was excessive blood found to be more common in neoplastic lumbar spine cases. Deep wound infections were more common in dorsal neoplastic lesions, in the patients in the age group of 41-50years. New neurological deficits were –were more common in infective cervical pathologies operated using anterior approach in the age group of 61-70. Implant failures were found to be common in post traumatic cervical injuries , operated using anterior approach in age group of 40-50years. The incidence of deep vein thrombosis was found to be more common in post traumatic traumatic spinal cases. Pneumonia's was common in dorsal infective pathology operated using anterior approach in the age group of 61-70years Urinary retention was found more common in lumbar pathologies operated using posterior approach.

Dural tears were common were seen most commonly in dorsal neoplastic pathologies in the patients above 50 years Following risk group patients more prone for developing complications: Cervical region involvement ,Neoplastic lesions ,Post traumatic spinal injury patients ,Elderly age group

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