

## Failed back surgery syndrome: Factors responsible and management

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**Objective:** To evaluate factors responsible for failed back surgery at our institution.

**Methodology:** This longitudinal and interventional study was conducted at Shifa International Hospital Islamabad over a time period of two years and included 30 consecutive patients of Failed back surgery syndrome. Pre-operative planning, preparation and surgery were performed by a single surgeon.

**Results:** Patients were divided in two groups; Group 1 consisted of 25 (83.3%) patients who underwent redo surgery and Group 2, 5(16.6%)

patients who were managed conservatively. Most common reason for failed back surgery syndrome was inappropriate surgical technique (residual disc fragments) in 18(72%) patients in group 1.

**Conclusion:** Proper pre-operative planning, good surgical technique, prevention of wrong level surgery, good sterilization and appropriate aseptic measures are some of the measures that can prevent failed back surgery syndrome. (Rawal Med J 201;42:226-230)

**Keywords:** Failed back surgery syndrome, redo spine surgery, intractable pain,

### INTRODUCTION

Failed back surgery syndrome (FBSS) is defined as persistent post-surgical intractable and recurrent low back pain, which may or may not be associated with weakness in one or both legs beyond a period of one year after disc surgery. Persistent pain has adverse effects on patient's psychological integrity, family and other interpersonal relationships. Failed back surgery syndrome is an imprecise term used to categorize a heterogeneous group of factors to residual symptoms after failed back failed back surgical treatment. It is not a definitive diagnosis and it is considered a syndrome because it has many explanatory etiologies both clinical and surgical<sup>5</sup>

The factors of failed back surgery can be poor patient selections, incorrect diagnosis, suboptimal selection of surgery, poor technique, failure to achieve surgical goals, and/or recurrent pathology. Successful intervention in this difficult patient population requires a detailed history, precise physical examination, and carefully chosen diagnostic tests. It is appropriate to analyze the bench-top rotational stability of disc replacement to predict whether this new technology is feasible for a larger prospective clinical study in the treatment of

degenerative scoliosis. The greater inherent rotational constraints of the cervical spine make it more amenable to stable multilevel arthroplasty compared with the lumbar spine.

In FBSS, surgical strategies focus on decompressing neural impingement or fusing unstable or putative painful intervertebral discs. Non-surgical interventions range from nerve root specific locks for pain relief to multidisciplinary rehabilitation programs geared towards improving function. Revision lumbar spine surgery employs use of elastic proteins in matrix and gel forms in interposition materials to prevent post-surgical epidural fibrosis, glucosamine and hypertonic dextrose dimethyl sulphaoxide (DMSO) injection in intervertebral discs.<sup>7,8</sup> Lumbar microdiscectomy with preservation of ligamentum flavum and intrathecal bupivacaine in combination with opioid injection technique have been practiced in different neurosurgical centers of the world.<sup>9-12</sup> The aim of this study was to evaluate factors responsible for FBSS at our institution.

### METHODOLOGY

This longitudinal and interventional study was

conducted at Department of Neurosurgery at Shifa International Hospital Islamabad over a period of two years. Sampling technique utilized was consecutive sampling. Study population consisted of thirty consecutive patients who were symptomatic after a period of 12 months of initial spine surgery, having persistent pain with or without sensory or motor deficit. Patients who recovered well after disc surgery and were symptom free post operatively were excluded from the study.

Patients who were diagnosed as a case of recurrent disc prolapse due residual disc fragment (inappropriate surgical technique), laminectomy was done (if hemileminectomy or fenestration was done previously, it was converted to full laminectomy, and if full lamectomy was done previously, it was re-explored only) followed by discectomy. In patients who were diagnosed as having post-op epidural fibrosis, re-exploration of pervious wound was done and fibrous adhesions were carefully broken. Steroids were used both intraoperatively and postoperatively. In patients presenting with cauda equine syndrome, full laminectomy and discectomy were done and ruptured disc fragment was removed from within the spinal canal. Patient presenting with spinal instability were treated with posterior stabilization with trans-pedicular screws and rods.

Post op spinal infection was treated with re-exploration, debridement and IV use of Broad Spectrum antibiotics initially, followed by culture positive antibiotics. Patients presenting with foraminal stenosis, was treated with foraminotomy and nerve root decompression. In Patients who presented with wrong level surgery, correct level laminectomy and discectomy was performed. Statistical software SPSS version 20 was used for data analysis.  $P < 0.05$  was considered significant.

## RESULTS

Out of 30 patients, group 1 (surgical treatment) had 25(83.33 %) patients and group 2 had (conservative treatment) 5(16.67%) patients. Age ranged from 25 to over 65 year (Table 1). There were more males in the study population (Table 2). Duration of hospital stay ranged from 5-45 days (Table 3).

**Table 1: Group wise age distribution.**

Age (Years)	Group 1 (n=24) Number (%)	Group 2 (n=5) Number (%)
25-35	9(36)	1(20)
36-45	11(44)	1(20)
46-55	2(8)	1(20)
56-65	2(8)	1(20)
>65	1(4)	1(20)

**Table 2. Male to female ratio.**

Gender	Group 1 (n=24) Number (%)	Group 2 (n=5) Number (%)
Male	17(68)	3(60)
Female	8(32)	2(40)

**Table 3. Duration of hospital stay (days).**

Stay (days)	Group 1 (n=24) Number (%)	Group 2 (n=5) Number (%)
5-15	14(56)	4(80)
16-25	6(24)	0(0)
26-35	2(8)	0(0)
36-45	2(8)	1(20)
>45	1(4)	0(0)

The factors responsible for FBSS in our study were inadequate surgical technique on 18 (72%) out of 25 patients leading to recurrent residual disc prolapse, epidural fibrosis in 2 (8%) patients, cauda equina compression in 1(14%), recurrent residual disc in 1 (4%) patients, spinal instability in 1 (4%) patients, post-operative spinal infection in 1 (4%) patients, foraminal stenosis or central canal stenosis in 1(4%) patients and wrong level surgery in 1 (4%) patients (Table 4). The level of failed back syndrome was L4-L5 in 10 (40%) out of 25 patients and L5-S1 in 15 (60%) patients. (Table 5)

**Table 4. Factors responsible for failed back surgery syndrome.**

Factors	Number	(%)
Inadequate surgical technique (Recurrent residual disc)	18	72
Epidural fibrosis	2	8
Cauda equine compression	1	4
Spinal instability	1	4
Postoperative spinal infection	1	4
Foraminal or central canal stenosis	1	4
Wrong level surgery	1	4

**Table 5. Level of failed back surgery syndrome.**

Level affected	Number (%)	Level specific clinical findings
L4/L5	10(40)	Dorsiflexion of foot Weak or absent
L5/S1	15(60)	Plantarflexion of foot Weak or absent

**Table 6. Frankle Grading.**

Frankle Grade	At the time of admission	At the time of discharge
<b>Group 1</b>		
A	0	0
4B	0	0
C	6 (24)	0
D	19 (76)	12 (48)
E	0	13 (52)
<b>Group 2</b>		
A	0	0
B	0	0
C	3 (60)	0
D	2 (40)	4 (80)
E	0	1 (20)

**Table 7. Group wise dorsiflexion of foot.**

	Group 1 (n=24)		Group 2 (n=5) Number (%)	
	Absent or weak (%)	Present	Absent or weak	Present
At the time of admission	5(20)	20(80)	3(60)	2(40)
At the time of discharge	0(0)	25(100)	3(60)	2(40)

**Table 8. Group wise plantar flexion of foot.**

	Group 1 (n=24)		Group 2 (n=5) Number (%)	
	Absent or weak (%)	Present	Absent or weak	Present
At the time of admission	6(24)	19(76)	2(40)	3(60)
At the time of discharge	0(0)	25(100)	2(40)	3(40)

**Table 9. Follow-up of return to normal daily activity group-1 (n=25).**

Follow-up (Days)	Group 1 (n=24) Number (%)	Group 2 (n=5) Number (%)
30-45	7 (28)	0 (0)
46-60	9 (36)	0 (0)
61-75	2 (8)	5 (100)
>75	7(28)	0(0)

**Table 10. Complications.**

Complications	Group 1 (n=24) Number (%)	Group 2 (n=5) Number (%)
Bed sore	1 (4)	1 (20)
Superficial soft tissue infection	1 (4)	0 (0)

Outcome of patients according to Frankle grading is shown in Table 6. Dorsiflexion of foot at admission and discharge is shown in Table 7. Plantar flexion of foot at admission and discharge is shown in Table 8. Return to daily activity varied from 30 to more than 75 days (Table 9). Most common complications were bedsores and soft tissue infection (Table 10).

## DISCUSSION

Failed back surgery syndrome has been a constant challenge for the practicing neurosurgeons all over the world. Yaksich from Australia published on of the largest series on lumbar spine surgery in which he reviewed 1861 laminectomy procedures, out of which 204 patients underwent surgery for failed back surgery syndrome.<sup>13</sup> The author asserted that surgical technique and technology will fail when an inappropriate patient is selected for surgical intervention; failure will also occur particularly in lumbar disc protrusion if lateral recess stenosis remains undiagnosed and untreated at the time of surgery. The patient motivation status also has a significant effect on surgical outcome and the optimum patient to submit to surgery for failed back surgery syndrome has sciatica, more severe than backache, a recurrent or residual disc protrusion and excellent motivation which is not affected by worker's compensation or other insurance claims of benefits.<sup>13</sup>

Hazard from USA, concluded that the surgical strategies for the management of FBSS focus on

decompressing neural impingement in majority of the cases.<sup>14</sup> However, in a very small number of cases presenting with instability, spinal stabilization should be done and emphasized that the non-surgical interventions range from nerve root specific blocks for pain relief to multidisciplinary rehabilitation programs geared toward improving function.<sup>14</sup> Rodriguez-Garcia et al carried out a study of 117 patients operated for herniated lumbar disc reported that most frequent clinical symptom was right sciatica, correlated to disc herniation at L5-S1 level and 37.9% presented with FBSS.<sup>15</sup> The predictive clinical factors of an unfavorable result were found to be bilateral sciatica, the presence of stenosis associated to herniated disc and comorbidity factors. The socio-labor factors identified were a low culture level and those working as drivers, or in building and service sectors. He concluded that one out of three patients operated for herniated lumbar disc presents as a case of FBSS.

Another study from USA emphasized that FBSS is a common problem with enormous costs to patients, insurers and society.<sup>6</sup> Regarding the etiological factors, he summarized that dialed back surgery can be due to poor patient selections, incorrect diagnosis, suboptimal selection of surgery, poor technique, failure to achieve surgical goals, or recurrent pathology. He suggested that successful intervention in this difficult patient population requires a detailed history, precise physical examination, and carefully chosen diagnostic tests.<sup>6</sup> Another study from Singapore highlighted that the dialed back surgery syndrome is a difficult diagnostic problem both clinically and radiologically.<sup>11</sup> Out of 43 patients, 15(33%) showed recurrent disc prolapse, 15(33%) showed postoperative epidural fibrosis, 8(18%) showed recurrent disc prolapse and epidural scarring, 4(9%) had spinal stenosis, 2 of whom also had both epidural fibrosis and recurrent disc prolapse, 2(4%) had normal MRI scans, 2(4%) had arachnoiditis and 1(2%) had post-operative pseudomeningocele formation. Gadolinium-diethylenetriaminepenta-acetic acid (Gd-DTPA)- enhanced MRI was particularly helpful in differentiating recurrent disc prolapse and epidural fibrosis. MRI correctly predicted recurrent disc prolapse in 6 patients,

epidural fibrosis in 4 patients and spinal stenosis in 1 patient illustrating the value of this modality in the evaluation of failed back surgery syndrome.<sup>16</sup>

It is evident from the above studies from different neurosurgical centers of international repute that the etiological factors of FBSS and the management strategies were almost the same in these studies, as we found in our study. Although there was slight variation in the percentage contribution of the individual factors, the overall scenario of FBSS in terms of etiology and management in our study was comparable to the international studies.

## CONCLUSION

The leading etiological factors of failed back surgery syndrome were recurrent disc prolapse of the residual disc fragments. Therefore, the incidence can be minimized with optimal surgical technique in the first surgery. Wrong level surgery can be avoided by having pre-op X-rays lumbosacral spine to rule out lumbarization and socialization. Other etiological factors of failed back surgery syndrome can be minimized by careful handling of the thecal sac and nerve roots and avoidance from unnecessary bone removal. Spinal instability is one of the etiologies of failed back surgery syndrome which may occur due to manipulation of the medial aspect of facets joints during laminectomy. In such a scenario, posterior stabilization using transpedicular rods and screws should be carried out after decompression of neural tissue.

### Author contributions:

Conception and design: SAS, ZB  
 Collection and assembly of data: SAS, ZB  
 Analysis and interpretation of the data: SAS, ZB  
 Drafting of the article: SAS, ZB  
 Critical revision of the article for important intellectual content: SAS, ZB  
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