

## **Gun shot of the spine Surgical out come and prognosis**

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### **Summary**

**Background:** the management of gun shoot wounds of the spinal cords (G sws) is still a debate whether to interfere surgically or not, the interference is usually laminectomy & Bullet extraction.

**Objectives:** A comparative prospective study between surgical & non-surgical management of G sws.

**Methods:** A case series study of (52) patients with G sws were managed by the neurosurgical unit in Ibn Sinna hospital in Mosul. 27 patients surgery was done, 25 patients non-surgical management.

A comparative study done according to the surgical outcome, improvement, mortality between the 2 groups in a mean follow up period of 4.5 months.

**Results:** The mean age was 35, (9-50 years) , mean follow up 4.5 months (3-7 months)no patients with non-surgical treatment show any improvement while 10 out 13 of incomplete injury show significant improvement by surgery, the mortality rate was also higher in the non-surgical group.

**Conclusion:** Bullet in the spinal cord with partial injury of the cord should be removed with decompression of the cord complete injury of the cord show poor prognosis with or without surgical intervention.

**Keywords:** Gun shoot wounds of the spinal cord ( G sws), Bullet, surgical decompression.

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### **Introduction :**

The surgical out come of G sws is usually poor with high mortality & morbidity (1) . the efficacy and appropriateness of surgical managements of G sws of the spine & subsequent functional recovery remain controversial (2,3,4,5).

The indication of surgery is decompressive Laminectomy & removal of bullet fragment CSF leak from the wound by repair of durmatter, the aim is to improve the condition of the neuro-logical state of the patient & prevent complications as infection & lead poisoning. (6,7,8)

The surgical technique is usually decompressive Laminotomy with removal of the Bullet fragment & removal of bone fragments (9).

The important complications include Infection, fistula formation (CSF), spinal cord cyst, Lead intoxication, pain. Autonomic Dysreflexia. ,DVT. Cardiovascular disease, Respiratory dysfunction. <sup>(10,11)</sup>

### **Materials & Methods:**

A prospective study of 52 patients with Gsws of the spine were managed by the Neuro-surgical unit, Ibn Sina hospital from Nov. 2006 to April 2007 ALL the patients had Gsws of the spine, all the patients data and records were obtained from the patients case sheet direct follow up was done.

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**Results:****Table (1) Demonstrate the number and percentage who had GSWs according to the level of injury and the management.**

Level of injury GSWs	Surgical management		No surgical		Total	
	No.	%	No.	%	No.	%
Cervical	5	18.5	6	24.0	11	21.2
Dorsal	12	44.4	17	68.0	29	55.8
Lumber (cauda equine)	10	37.1	2	8.0	12	23.0
Total	27	100	25	100	52	100

**Table (2) Distribution of type injuries in the studied patients according to the level of injury and severity.**

Level of injury GSWs	Complete injury GSWs		Incomplete injury GSWs		Total	
	No.	%	No.	%	No.	%
Cervical	6	24.0	5	18.5	11	21.2
Dorsal	17	68.0	12	44.4	29	55.8
Lumber (cauda equine)	2	8.0	10	37.1	12	23.0
Total	25	100	27	100	52	100

**Table (3) Type of management according to severity of injury in GSWs.**

Level of injury	Surgical management		No surgical		Total	
	No.	%	No.	%	No.	%
Incomplete injury	19	70.4	8	32.0	27	51.9
Complete injury	8	29.6	17	68.0	25	48.1
Total	27	100	25	100	52	100

**Table (4) Comparison of percentage of improvement in patients who had incomplete GSWs injury according to the surgical and non-surgical management.**

Level of injury GSWs	Surgical management			No surgical			P-value
	N	No. of improved	%	N	No. of improved	%	
Cervical	5	4	80.0	1	1	100	0.83 (NS)
Dorsal	6	0	0.0	6	0	0.0	NS
Lumber (cauda equine)	8	6	75.0	1	0	0.0	0.33 (NS)
Total	19	10	52.6	8	1	12.5	0.057 (NS)

NS = not significant

**Table (5) Comparison of percentage of improvement in patients who had complete GSWs injury according to the surgical and non-surgical management.**

Level of injury GSWs	Surgical management			No surgical			P-value
	N	No. of improved	%	N	No. of improved	%	
Cervical	1	0	0.0	5	0	100	NS
Dorsal	6	0	0.0	11	0	0.0	NS
Lumber (cauda equine)	1	1	100	1	1	100	1.0 (NS)
Total	8	1	12.5	17	1	14.3	0.055 (NS)

NS = not significant

**Table (6) Indications of surgery in GSWs in patients who managed by neuro-surgical unit.**

Cause	No.	%	p-value
1. Injury to the cauda equine compression of nerve root.	8	29.5	0.04
2. Neurological deterioration (spinal epidural haematoma)	1	3.7	
3. Spinal cord or nerve root compression	8	29.5	
4. C.S.F. of leak	2	7.4	
5. Spinal instability	2	7.4	
6. Decompression and intra spinal bullate removal	6	22.2	
Total	27	100	

**Table (7) Mortality according to the level of injury in surgical group.**

Level of injury (GSWs)	N	Death		p-value
		%	No.	
Cervical	6	1	16.7	0.037
Dorsal	12	4	33.3	
Lumber (cauda equina)	9	0	0.0	
Total	27	5	18.5	

Using Fisher Freeman Halton test

**Table (8) Mortality according to the level of injury in non-surgical group.**

Level of injury (GSWs)	N	Death		p-value
		%	No.	
Cervical	6	5	83.3	0.0143
Dorsal	17	6	35.3	
Lumber (cauda equina)	2	2	100	
Total	25	13	25.0	

Using Fisher Freeman Halton test

Table (9) Causes of death in GSWs.

Cause	No.	%	p-value
1. Respiratory complications	10	55.5	0.022
2. Meningitis septicemia	5	27.8	
3. Bed sore infection rental failure	1	5.6	
4. Upper GIT bleeding	2	11.1	
Total	18	100	

Table (10) Comparison of mortality in surgical and non-surgical management according to level of injury.

Level of injury (GSWs)	N	Surgical		N	Non-surgical		p-value
		%	No.		%	No.	
Cervical	5	1	20.0	6	5	83.3	<0.05
Dorsal	12	4	33.3	17	6	35.3	>0.05 (NS)
Lumber (cauda equine)	10	0	0.0	2	2	100	<0.05
Total	27	5	18.5	25	13	37.1	

Table (11) Improvement according to the type of velocity missile.

Type of injury	Improve		Non-improve		Total	
	No.	%	No.	%	No.	%
High velocity missile bullet	8	57.14	17	44.74	25	48.08
Low velocity missile bullet	1	7.14	4	10.53	5	9.62
Shellpines	5	35.71	17	44.74	22	42.31
Total	14	100	38	100	52	100

Non significant relationship  $p > 0.05$  using Fisher Freeman Halton test

### Discussion:

The important indication for surgical intervention in our series was to relieve spinal cord and/or Cauada equina or nerve root compression from primary or secondary fragments, herniated discs or hematomas<sup>(12, 13, 14)</sup> of same insidance 29.5 and the results of stastastical significance P 0.04 Table 6. Although it would be seem logical that removal of offending compressive fragments could help relieve ridiculer pain & promote functional

recovery in the incomplete Cauada equina & cervical or spinal cord injuries<sup>(12,13,14)</sup> several reports indicate that surgery does not significantly affect the final recovery of the function, wether cord damages is complete or incomplete<sup>(18, 19, 20, 21, 22, 23)</sup> surgical exploration however has been advocated for G sws injuries of the Cauada equina and cervical G sws<sup>(15, 16, 17)</sup>.

The study shows more improvement in those patients with incomplete spinal cord compression,

but that improvement is of no statistical significance P value in cervical grade 0.8, (NS) and in Cauda equina 0.33 Table 4.

We had 6 patients from 10 in our small series with an incomplete Cauda equina injury improved in their functional capacity after surgical decompression and bullet removal, and 4 patients from 5 cervical grades of the spine had improved also in our series table 4. Several reports indicate that surgery does not significantly affect the final recovery of function whether cord damage is complete or incomplete<sup>(18, 19, 20, 21, 22, 23, 24, 25)</sup>.

Thus we are back to a devastating outlook of those wounds as seen by war time surgeons. Is there nothing to be offered for those patients our institution? We have taken an aggressive approach to these injuries only long term follow up will tell us if this approach makes a difference in the quality of the lives of these patients.

The study also shows no improvement of complete spinal cord injury with surgery which goes with most studies<sup>(18, 19, 20, 21, 22, 23, 24, 25)</sup>.

### **Conclusion:**

Bullet in the spinal cord with partial injury of the cord should be removed with decompression of the cord. Complete injury of the cord shows poor prognosis with or without surgical intervention.

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