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Gunshot Injuries of the Spine The Outcome Assessment of a Series of Twenty-One Patients

Mohamed Ragab Nagy, MD., Mohamed Ali Elgaidi, MD.

Neurosurgery Department, Faculty of Medicine, Cairo University, Cairo, Egypt.

ABSTRACT

Background Data: Gunshot injuries of the spinal cord represent a complex, multidisciplinary management challenge for spine surgeons. Many unique factors can affect the decision-making and management of this controversial type of injuries.

Study Design: A retrospective cohort study.

Purpose: To assess the clinical outcome and complications after treating patients with gunshot injuries of the spinal cord and the thecal sac.

Patients and Methods: This study included 21 patients with spinal gunshot injuries. The mean age was 30.9 ± 4.1 (range, 24–40) years; all patients were males except for one female. The American Spinal Injury Association (ASIA) scale was used to assess the initial neurological status and during the follow-up period. Twelve patients had complete spinal cord injury (CSCI), whereas nine patients had incomplete spinal cord injury (ISCI). The most common involved spinal region was the thoracic spine (52.4%), followed by the lumbar spine (28.6%), then the cervical spine (19%).

Results: Fourteen patients were managed conservatively: eight (57.1%) improved, including two patients with CSCI. Seven patients were managed surgically: four (57.1%) improved, including one patient with CSCI. There was no significant difference in the final clinical outcome between the two management protocols. The mean improvement of the 12 patients who showed improvement was 1.17 ASIA grade: only two patients improved two grades (none of them had CSCI), and the other ten patients improved only one grade. The worst prognosis was the thoracic injury with the occurrence of the two follow-up deaths and the least recovery rate of 3/11 (27.3%), while the lumbar spine had the best prognosis with all six patients improving with a mean 1.3 ASIA grade improvement without any follow-up deaths.

Conclusion: The clinical outcome of gunshot injuries of the spine was dependent on the initial ASIA grade and the spinal injury level, while the cauda equina injuries had a better prognosis irrespective of the management modality. (2020ESJ218)

Keywords: Gunshot spine injury; Missile injury; Penetrating spinal cord injury; Management; Outcome.

Address correspondence and reprint requests: Mohamed Ragab Nagy, MD.
Department of Neurosurgery, Faculty of Medicine, Cairo University
Email: a dr_mohamedragab@hotmail.com

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INTRODUCTION

Gunshot injuries of the spine are the third most common cause of spinal injuries after falls from heights and road traffic accidents[25] and represent 13–17% of all spinal injuries worldwide.[12] Gunshot injuries of the spine can be a devastating event with extensive morbidity and mortality. The initial neurological status is considered to be the main prognostic factor for recovery after such injuries.[9,17] While these injuries affect the thoracic spine predominantly, the cervical injuries are more likely to cause complete spinal cord injury (CSCI).[31] Beside the clinical sequelae of spinal gunshot injuries, there is a significant economic impact resulting from the hospital stay and rehabilitation.[34]

The treatment of gunshot injuries of the spine may be conservative or surgical. The indications of the surgical management of such patients include progressive neurological deterioration, spinal instability, persistent cerebrospinal fluid (CSF) fistulae, and abscess formation.[13,19,21] The decision of whether to follow a conservative or a more invasive approach is challenging with these injuries. Concomitant injuries add to the complexity of this type of injury and usually require a multidisciplinary team for patient care. Optimal management of patients with gunshot injuries of the spine is still debatable.[1]

This study aimed to assess the clinical outcome and complications of patients with gunshot injury of the spinal cord and thecal sac and to discuss the indications and options of surgical intervention in such cases.

PATIENTS AND METHODS

This is a retrospective cohort study conducted on 21 patients with gunshot injuries of the spine who presented to the Emergency Department, Faculty of Medicine, Cairo University Hospital from May 2016 to May 2020. Our institutional medical records were reviewed through that period and data of all patients admitted under the diagnosis of gunshot spinal injuries were collected. We included all patients with gunshot injuries at any level, age, sex that have been treated either conservatively or surgically. Patients with incomplete clinical, radiograph, and contact data and those with adequate follow-up were excluded from this study. We could trace 21 patients that were eligible for this study out of total 27, while six patients were considered not eligible for our study according to our inclusion criteria. All patients formally consented, and the study was approved by our IRB.

The initial management of all patients followed the standard trauma protocols, with priority being given to the maintenance of the airway, respiration, and circulation. Immediate cervical spine immobilization and log roll procedure of the thoracolumbar spine was also included in the initial assessment of any possible spinal injury before clinical and radiological data can be collected to ensure mechanical spinal stability. After the patients were stabilized, they were subjected to general, full neurological examination and radiological investigations.

A detailed history was obtained, including the type of firearm weapon, the number of shots fired, and the distance between the firearm and the victim when feasible. A full neurological evaluation was conducted at the time of the injury to document motor function, sensation, and reflexes. In order to determine any decline in neurological function, a periodic evaluation was performed. The patients were examined for entry and exit wounds, the level of spinal injury, neurological status, CSF leak, and associated injuries to other body organs. The American Spinal Injury Association (ASIA) scale[2] was used to assess the initial neurological status and during the follow-up period. Radiological investigations included plain anteroposterior, lateral, and flexion/extension X-rays and computed tomography (CT) to help identify the gunshot path, detect vertebral fractures, assess the spinal stability, and look for retained

intraspinal bullets or bony fragments. Magnetic Resonance Imaging (MRI) of the spine was done for two patients to evaluate the ligamentous and neural structures after progressive neurological deterioration. There were no bullet or metallic fragments in the spinal canal in these two patients. The included patients in the study were divided into two groups according to the management method. Group I included 14 patients who were managed conservatively, and Group II included seven patients who were managed surgically due to progressive neurological deterioration in two patients, repair of CSF leak in 3, and spinal fusion in two. It is worth noting that bullet extraction was not an indication for surgery unless associated with instability, CSF leak, or neurological deterioration. All patients were offered conservative management as a first-line treatment unless surgical intervention was indicated. Broad-spectrum antibiotics covering both Gram-positive and Gram-negative bacteria were initiated immediately following the injury. When no visceral injury was reported, antibiotics were continued for 5–7 days and 7–14 days for visceral injury. Prophylaxis of tetanus was administered, especially when immunization status is uncertain in patients with less than three tetanus toxoid doses and patients with a history of three or more tetanus vaccine doses but with more than five years after the last dose. We did not use steroids in the treatment regimen for the patients.

Surgical treatment was indicated in patients with progressive neurological deficits with radiological evidence of neural compression, persistent CSF leak, spinal instability, and bullet removal at T12 to L4 with incomplete spinal cord injury (ISCI). The injuries with severe vertebral body comminution, bilateral facet or pedicle fracture, or posterior ligamentous complex disruption leading to impaired sagittal and coronal balance or frank translational displacement were deemed unstable. The timing of surgery was as soon as possible after stabilization of patient condition.

The specific surgical intervention was selected based on the unique features of the injury. Spinal decompression via either laminectomy or anterior approach was indicated when there was significant neural compression. Following extensive decompressive laminectomy, spinal instability was reevaluated to avoid potential iatrogenic instability. Instrumentation fusion was planned in case of primary segmental instability or secondary iatrogenic instability after wide decompression. For persistent CSF leak, the dural repair was done either primarily or by using a graft augmented with fibrin glue with a submuscular drain left in situ.

During the follow-up visits in the outpatient clinic, the patients were assessed clinically and when needed radiologically and/or with MRI. The clinical outcomes were measured at acute hospital admission, rehabilitation center admission, and rehabilitation center discharge and then every 6 months during the follow-up period. The mean follow-up period was 17 ± 2.2 (range, 6–47) months. Improvement of the patients was considered on clinical backgrounds, including neurological assessment using ASIA Scale.

Statistical Analysis:

Data were statistically described in terms of mean ± standard deviation (SD), median and range, or frequencies (number of cases), and percentages when applicable. Comparison of numerical variables between the study groups was performed using the Mann–Whitney *U* test for independent samples. A Chi-square test was performed to compare categorical data. However, Fisher's exact test was used instead when the predicted frequency is less than 5. Comparison of categorical data within group was done using the McNemar test. Two-sided *p* values less than 0.05 were considered statistically significant. All statistical calculations were performed using the computer program IBM SPSS (Statistical Package for the Social Science; IBM Corp, Armonk, NY, USA) release 22 for Microsoft Windows.

RESULTS

This study reported 21 patients who presented with gunshot injuries of the spine during a four-year study period. All patients were males except one female. The mean age was 30.9 ± 4.1 (range, 24–40) years. All 20 male patients suffered from a high-velocity gunshot injury, while the female patient had a low-velocity injury. There was retained bullet or metallic fragments in the spinal canal in six patients (28.57%); three of them were extracted during surgical intervention. Twelve patients presented with CSCI (ASIA grade A), and nine patients presented with ISCI. All the patients with thoracic injury presented with ASIA grade A.

Patients were divided into two groups according to the method of management (Table 1 and Figure 1). Group I (conservative group) included 14 patients (66.7%) who received medical treatment and rehabilitation (Figure 2). Group II (surgical group) included seven patients (33.3%) who were managed surgically (Figure 3). Out of seven patients, three (42.8%) underwent operation due to persistent CSF leak; two (28.6%) underwent operation by decompression due to progressive neurological deterioration; two (28.6%) underwent operation by decompression and fixation due to spinal instability (Table 2).

Eight out of 14 patients (57.1%) improved neurologically in the conservative group, including two patients with CSCI and six patients with ISCI ($p < 0.05$). Four out of seven patients (57.1%) improved in the surgical group at the final follow-up period, including one patient with CSCI and three patients with ISCI ($p < 0.05$). The mean improvement in the 12 patients that showed improvement in both groups was 1.17 grade: only two patients improved 2 grades (none of them had CSCI) and ten patients one grade. Although the neurological improvement was significant within both groups ($p < 0.05$), there was no significant difference in the final clinical outcome between both groups ($p = 0.852$).

As a whole, the most common involved spinal region was the thoracic spine (52.4%), followed by the lumbar spine (28.6%), then the cervical spine (19%) (Table 3). The worst prognosis was the thoracic spine injury with two follow-up deaths and the mean recovery of three out of 11 patients (27.3%) was 0.27 ASIA grade improvement. In the cervical spine, three out of four (75%) showed mean improvement 0.75 ASIA grade improvement, while in the lumbar spine, which has the best prognosis, all six patients (100%) showed a mean improvement of 1.3 ASIA grade with no follow-up deaths.

Eleven patients (52.4%) had associated injuries of other systems; 7 of 14 patients (50%) in the conservative group and 4 of 9 patients (57.1%) in the surgical group. There were five associated hemopneumothoraxes, all of which necessitated the insertion of an intercostal tube (ICT). Three patients who had fractured ribs were managed conservatively. There were seven associated abdominal injuries; 5 (71.4%) were managed through laparotomy and 2 (28.6%) were managed conservatively. There was no significant difference in the associated injuries between the two study groups ($p = 0.562$) (Table 4).

Within the conservative (N = 14) group, 4 patients (28.6%) suffered from five complications. These included meningitis (2 cases), bedsores (2 cases), and pneumonia (1 case). One patient (7.1%) died on day 14 postadmission due to sepsis and multiorgan failure. On the other hand, in the surgical group, 4 patients (57.1%) suffered from seven complications. These included CSF fistula (1 case), meningitis (2 cases), deep venous thrombosis (1 case), bedsores (2 cases), and pneumonia (1 case). One patient (14.2%) died on day 23 postoperatively due to pulmonary embolism. Although the complication rate was higher in the surgical group than the conservative group, it was not statistically significant ($p = 0.213$).

Table 1. The characteristics of the patients in the study group (N = 21)

Characteristic	Conservative group (N = 14)	Surgical group (N = 7)	*p* value
Age (years)	30.79 ± 4.82	31.14 ± 2.55	0.736
Sex (M/F)	14/0	6/1	0.333
Spinal levels involved			
Cervical spine (N = 4)	3	1	0.590
Thoracic spine (N = 11)	8	3	
Lumbar spine (N = 6)	3	3	
ASIA grade on admission	8 A, 2 B, 2 C, 2D,0E	4 A, 1 B, 2 C, 0D, 0E	0.682
Hospital stay (days)	14.93 ± 4.67	14.57 ± 5.35	0.852
Rehabilitation stay (days)	36.31 ± 11.21	34.33 ± 10.78	0.725
Follow-up (months)	16.62 ± 10.27	17.83 ± 8.66	0.692

*p value less than 0.05 was considered statistically significant.

Table 2. Summary of data of patients managed surgically in this study (N = 7)

No.	Age/year	Sex	Level	Indication for surgery	Surgical intervention	Associated injuries	Preop. ASIA	Final ASIA	Complications
1	30	F	L	Instability (RT L4 pedicle fracture), CSF leak	Dural repair, fixed L3-L5		C	D	
2	35	M	T	CSF leak	Laminectomy and dural repair (+bullet removal)	Fracture ribs, hemopneumothorax, (intercostal tube)	A	B	
3	27	M	C	Fixation to help rehabilitation	C5 corpectomy, C4-C6 anterior plating		A	A	Meningitis and bed sores
4	33	M	L	Progressive neurological deterioration	Laminectomy	Liver, spleen injury, laparotomy	B	C	Pneumonia
5	32	M	L	Progressive neurological deterioration	Laminectomy (+with bullet removal)	Bowel injury, repair	C	E	
6	30	M	T	CSF leak	Laminectomy and dural repair		A	A	Meningitis and bed sores
7	31	M	T	CSF leak	Laminectomy and dural repair (+bullet removal)	Hemopneumothorax, ICT, spleen injury, splenectomy	A	Died on day23 postop	CSF fistula and DVT

C: cervical, T: thoracic, L: lumbar, ICT: intercostal tube, F: female, M: male, DVT: deep vein thrombosis.

Table 3. The final clinical outcome concerning the involved spinal levels.

Clinical outcome	All patients (N = 21)			Conservative group (N = 14)			Surgical group (N = 7)		
	Cervical	Thoracic	Lumbar	Cervical	Thoracic	Lumbar	Cervical	Thoracic	Lumbar
Improved	3	3	6	3	2	3	0	1	3
Stable	1	6	0	0	5	0	1	1	0
Died	0	2	0	0	1	0	0	1	0

Table 4. The reported associated injuries of patients in the study groups (N = 21).

The associated injuries	Conservative group (N = 14)	Surgical group (N = 7)
Hemopneumothorax	3 (21.4%)	2 (28.6%)
Mild apical pneumothorax	1 (7.1%)	0 (0%)
Fracture ribs	2 (14.2%)	1(14.2%)
Spleen injury	1 (7.1%)	1 (14.2%)
Bowel injury	2 (14.2%)	1 (14.2%)
Liver injury	0 (0%)	1 (14.2%)
Diaphragm injury	1 (7.1%)	0 (0%)

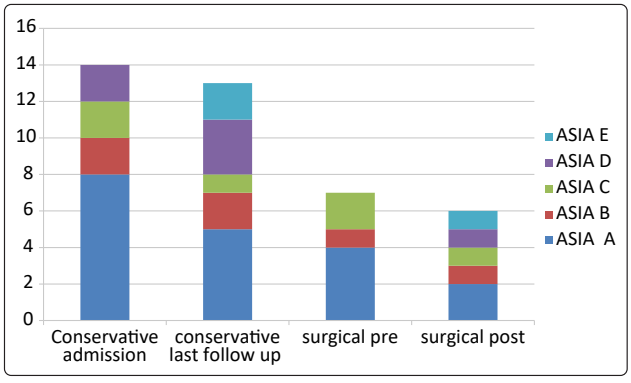

Figure 1. A stacked column figure showing the neurological grading according to the American Spinal Injury Association (ASIA) scale of both the conservative and surgical groups at admission and last follow-up. NB: the follow-up columns of both conservative and surgical groups are shorter due to the death of one patient in each group.

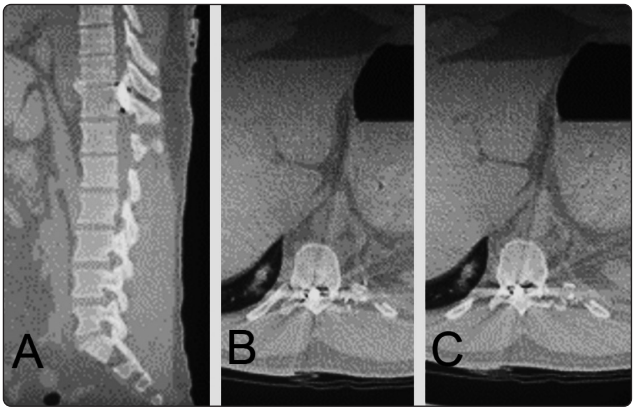

Figure 2. A 34-year-old male patient who presented after gunshot injury with CSCI (ASIA grade A): (A) CT of the thoracolumbar spine sagittal view shows an intraspinal bullet opposite D11 vertebral body measuring about 2.6 cm at its maximum length. (B) and (C) CT of the dorsal spine axial views showing a comminuted fracture involving the left aspect of the D11 posterior neural arch and left transverse process with retropulsed small intraspinal bone fragment. The patient was treated conservatively and his neurological status was stable at the final follow-up period.

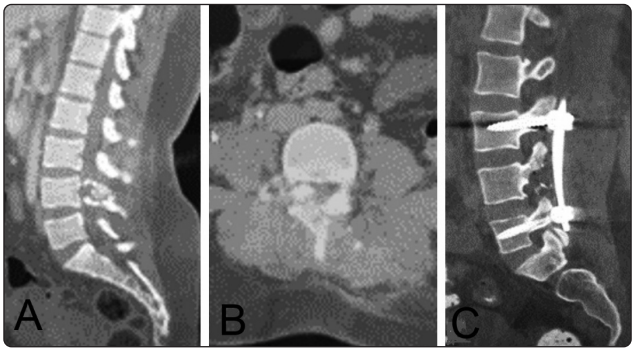

Figure 3. A 30-year-old female patient who presented after gunshot injury by ISCI (ASIA grade C): CT of the thoracolumbar spine where the (A) sagittal and (B) axial views showing right L4 pedicle and laminar fracture. The patient was managed surgically by decompression, dural repair, and fixation. (C) Sagittal CT view of the lumbosacral spine shows evidence of partial spinolaminectomy of L4 vertebra and internal fixation of L3and L5 vertebrae. The patient improved to ASIA grade D following the surgery.

DISCUSSION

The effect of spinal gunshot injuries on the health care systems is substantial. The expected lifetime health care cost in the USA in 2011 for a 25-year-old with quadriplegia was more than $4.5 million per patient, not including the loss of economic opportunity.[4] Many factors can affect the decision-making in this type of complex injury. These factors include mechanical factors such as the type of firearm weapons, the speed and size of the projectile, and the distance between the firearm and the target; biological factors including the site of injury, the presenting neurology, contaminated tissue in the spinal canal, CSF leak, and associated visceral injuries.[16] The ultimate neurologic outcome in patients with spinal gunshot injuries is most closely related to the initial neurological status rather than the treatment method.[3]

In this study of 21 patients with spinal gunshot injuries, males represented 95% of the patients with a mean age of 31 years. The most common involved spinal region was the thoracic spine (52.4%), followed by the lumbar spine (28.6%), then the cervical spine (19%). The cervical spine injuries may be even more catastrophic; however, these results may be due to selection bias as severe injuries may result in apnea or associated vascular injuries and death at the scene before hospital transfer. Less severe cases are transferred to the hospital. Our results are consistent with the published civilian and military literature. The spinal gunshot injuries affect males in 78–91% of the cases, with the highest incidence in the third decade of life.[10,30] They usually involve the thoracic spine in 45.6–63% of the patients, followed by the lumbosacral spine (20–36%), then the cervical spine (10–24%).[4,21,31] There are two general types of damage caused by projectiles to the spinal cord, which include direct mechanical injury via the projectile and indirect injury through shock waves or cavitation from high-energy projectile.[16]

Fourteen patients (66.7%) with spinal gunshot injuries were managed conservatively in this study. Conservative management includes aseptic wound cleaning, frequent dressing, empirical broad-spectrum antibiotics, shift towards culture-based antibiotics, and pulmonary support to ensure proper oxygenation in selected patients, especially thoracic injury victims.[17,31] Many studies supported the conservative approach in both complete and incomplete neurological injury.[15,22,32]

In the current study, adjunctive steroid therapy was not used. This approach is supported by Levy et al.[23] retrospective nonrandomized study of 252 patients with penetrating missile spine injuries. Seventy-one percent of their patients received conventional management without adjunctive steroid, while 21% of patients followed the second National Acute Spinal Cord Injury Study (NASCIS) protocol of using intravenous methylprednisolone. They concluded that methylprednisolone did not significantly restore neurological function.

In our study, seven patients were managed surgically (4 CSCI; 3 ISCI). Out of the four patients with CSCI, only one improved neurologically while the other three patients did not improve. The three patients with ISCI improved neurologically during the postoperative follow-up period. Fourteen patients were managed conservatively (8 CSCI; 6 ISCI). Out of the eight patients with CSCI, two improved and six did not improve neurologically. The six patients with ISCI improved neurologically during the posttreatment follow-up period. It is worth noting that the three patients who improved from 12 cases with CSCI just had only one higher grade (grade B) with some sensory recovery without any motor function.

These results are consistent with the results of Aarabiet al.[1], who reported 87 patients managed surgically (55 CSCI; 32 ISCI) and 58 patients managed conservatively (35 CSCI; 23 ISCI). In the surgical group, 13 patients with CSCI and 29 patients with ISCI improved, while in the conservative group, nine patients with CSCI and all 23 patients with ISCI improved at the follow-up. These results are also comparable to the results of Bhatoe and Singh,[6] who reported 16 patients

managed surgically (10 CSCI; 6 ISCI) and two patients with ISCI managed conservatively. In the surgical group, only one patient with CSCI and all the six patients with ISCI improved, while in the conservative group, the two patients improved at the follow-up period.

However, there was a higher incidence of patients with ISCI in the Duz et al.[13] series. They reported 60 patients managed surgically (6 CSCI; 54 ISCI) and 40 patients managed conservatively. Nevertheless, the improvement was more noticed in patients with ISCI. Thirty-three patients improved at the follow-up after surgery (2 CSCI; 31 ISCI) and 23 patients improved in the conservative group (3 CSCI; 20 ISCI). Rathore et al.[28] reported five patients with CSCI; all of them were managed conservatively. During the follow-up period, two patients improved. Splavski et al.[33] reported 20 patients; they were all managed surgically (9 CSCI, 11 ISCI). Although all the patients with CSCI did not improve, all patients with ISCI improved during the follow-up period.

The decision-making process in treating gunshot injuries of the spine, whether conservatively or surgically, represents a real dilemma. The primary aim of surgical intervention is to avoid neurological deterioration, improve the neurologic deficit, repair CSF leak if present, and stabilize the spine.[14] Urgent surgical decompression is indicated in new-onset or progressive neurological deficit caused by expanding hematoma, intramedullary bullet, or bone fragment.

An aggressive approach is recommended in patients with CSF leak after gunshot injuries to prevent meningitis in such patients.[24] The initial management is surgical debridement of foreign bodies, bone fragments, devitalized tissues, and dural repair, usually with a facial or synthetic graft and fibrin glue due to associated dural tissue loss in such injuries.[8] If the CSF leak persists, a lumbar subarachnoid drain is recommended for few days.

There is a consensus that surgical intervention in patients with CSCI is of no value. Several studies have stated that decompressive laminectomy not only is ineffective for neurologic recovery but also may result in iatrogenic spinal instability. Furthermore, removing the bullet may not decrease the infection rate.[21,31]According to a series of Robertson and Simpson[29] of 30 patients with gunshot wounds to the cauda equina region, lumbar laminectomy yielded the same neurological outcome compared to conservative management with a high rate of postoperative complications. However, Waters and Adkins reported statistically significant motor improvement after bullet extraction, specifically from T12 to L4 levels after retrospectively studying 90 patients with bullet fragments lodged in the thoracolumbar spine. Unfortunately, surgical removal of the bullet fragments is not effective in reducing subsequent pain in gunshot spinal cord injury victims who usually experience more pain than those injured in other mechanisms.[35]

Assessment of spinal stability in patients with gunshot injuries is challenging. The Thoracolumbar Injury Classification and Severity Scale (TLICS) has several limitations in patients with gunshot injuries, as this system does not consider the need for surgery, debridement, or dural repair.[26] Also, MRI is contraindicated in cases with an intramedullary bullet or metallic fragments. Consequently, the posterior ligamentous complex cannot be assessed accurately.

Although surgical intervention does not improve neurological recovery rates, early surgical timing seems to decrease the incidence of postoperative complications. Higher infection rates (17%) were observed in the cauda equina region when surgery was delayed more than two weeks after the injury.[11]

In this study, eleven patients (52.4%) had associated injuries; most of them were in the abdomen and thorax. Laparotomy was done in five cases and an intercostal chest tube was inserted in five cases. In Kahraman et al.[19] series, there were overall associated injuries in 46.2% of the patients; mainly at the abdomen, 20.8%; chest, 17%; neck, 8.5%. In Blair et al.[7] series, the overall incidence of associated injuries was 78.1%: multiple injuries, 44.5%; abdomen, 24.9%; chest, 26.6%; head, 22.7%; face, 21.2%. Management

of spinal gunshot-associated nonneurological injuries takes priority over the neurological ones, which is usually lifesaving.

Regarding lumbar gunshot injuries, associated gut perforation is a significant factor in determining the outcome with higher rates of spinal infection, meningitis, and CSF fistula.[18] Empirical broad-spectrum antibiotics covering Gram-positive, Gram-negative, and anaerobic bacterial flora should be started in patients with suspected bowel perforation for 7 to 14 days.[16,17,31]Projectiles traversing the colon before striking the spinal column are particularly serious injuries, which usually require a lifesaving laparotomy as the initial treatment.[27] Such patients should be monitored for meningitis and spinal fixation should be postponed for at least two weeks.[20]

The complications encountered in this study varied from meningitis, bedsores, pneumonia, CSF fistula, deep vein thrombosis, and sepsis. Although the complication rate was higher in the surgical group than the conservative group, it was not statistically significant. The complications after spinal gunshot injuries are not limited to primary complications from spinal cord dysfunction and associated injuries but include secondary and delayed-onset complications such as chest and urinary tract infection and deep venous thrombosis and pulmonary embolism.[5,9] Most of such complications are not due to the management option chosen but rather the sequel of the injury.[5,9,10,13] In Simpson's series,[32] complications were encountered more often in the surgical group (22%) than the conservative group (7%). There were two mortalities in this study due to pneumonia, sepsis, and pulmonary embolism.

This study has some limitations that include a retrospective cohort design and a noncomparative study due to the limited number of patients population and nonmatching pathology type. Moreover, several variables that predict the management and outcome of spinal gunshot injures, such as the type of firearm weapon used, the projectile's path and size, and the distance between the firearm and the target, were not evaluated in some patients. Prospective comparative studies with a larger sample size with more concern about the quality of the patients' life after gunshot injuries of the spine are warranted to authenticate the results.

CONCLUSION

The strongest prognostic predictor of future neurological function after gunshot injuries of the spinal cord was the initial neurological status. Although both conservative and surgical treatments were effective in treating gunshot injuries of the spine, no significant difference in the final clinical outcome was observed between both modalities of treatment. Cauda equina injuries had a better prognosis regardless of whether they were treated conservatively or surgically.

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الملخص العربي

إصابات الطلقات النارية للحبل الشوكي: تقييم نتائج علاج سلسلة من واحد وعشرين مريضا

البيانات الخلفية: تمثل إصابات طلقات الرصاص في العمود الفقري تحديات معقدة للغاية لجراحي العمود الفقري وهي تحتاج إلي تخصصات متعددة. يمكن للعديد من العوامل أن تغير طريقة العلاج واتخاذ القرار في هذا النوع من الإصابات المعقدة.

تصميم الدراسة: دراسة حالات استعادية إكلينيكيا.

الغرض: تقييم النتائج والمضاعفات السريرية بعد علاج المرضى الذين يعانون من إصابات ناجمة عن طلقات نارية في النخاع الشوكي.

المرضى والطرق: بين مايو 2016 ومايو 2020 ،أجريت دراسة بأثر رجعي على 21 مريضا أصيبوا بطلقات نارية في العمود الفقري. كان متوسط العمر 30.9 ± 4.1 (المدى ، 24-40) سنة ، بينما كان جميع المرضى من الذكور باستثناء أنثى واحدة. تم استخدام مقياس جمعية إصابات العمود الفقري الأمريكية لتقييم الحالة العصبية الأولية وأثناء فترة المتابعة. كان اثنا عشر مريضا يعانون من إصابة كاملة في النخاع الشوكي ، بينما كان تسعة مرضى يعانون من إصابة غير كاملة في الحبل الشوكي.

النتائج: تمت معالجة أربعة عشر مريضًا بشكل تحفظي ، ثمانية منهم (57.1٪) تحسنوا ، بما في ذلك مريضان مصابان بإصابة كاملة في النخاع الشوكي ، وتمت معالجة سبعة مرضى جراحيًا أربعة منهم (57.1٪) تحسنوا ، بما في ذلك مريض واحد مصاب بإصابة كاملة في النخاع الشوكي. لم يكن هناك فرق إحصائي في النتيجة السريرية النهائية بين المجموعتين. كان متوسط التحسن لدى 12 مريضًا 1.17 درجة ، مع تحسن مريضين فقط درجتين (لم يكن لدى أي منهم إصابة كاملة في النخاع الشوكي) ، بينما تحسن المرضى العشرة الآخرون درجة واحدة فقط. كانت منطقة العمود الفقري الأكثر إصابة هي العمود الفقري الصدري (52.4٪) ، تليها منطقة أسفل الظهر (28.6٪) ، ثم العمود الفقري العنقي (19٪). كان أسوأ نتائج مع إصابة العمود الفقري الصدري مع حدوث حالتي وفاة أثناء فترة المتابعة وأقل معدل شفاء قدره 11/3 (27.3٪) ، بينما كان للعمود الفقري القطني أفضل أفضل نتائج مع تحسن جميع المرضى الستة بمتوسط 1.3 درجة تحسن دون أي وفيات أثناء فترة المتابعة.

الخلاصة: النتيجة السريرية لإصابات الطلقات النارية في العمود الفقري اعتمدت على درجة مقياس جمعية إصابات العمود الفقري الأمريكية قبل العلاج ومستوى إصابة العمود الفقري حيث كان لإصابات ذيل الفرس أفضل النتائج بغض النظر عما إذا كان قد تم علاجها بشكل متحفظ أو جراحي.