

Firearm Injury of the Spine; Clinical Experience and Surgical Outcome

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Abstract

Background: Occurrence of firearm injury in the civilian population has been increased in recent years, due to difficulties in management of firearm injuries to spine and debates make it a devastating injuries.

Aim of Study: To discuss the etiology, diagnosis and type of treatment in patients exposed to firearm injury to spine region.

Patients and Methods: This study include 3 male patients exposed to Firearm injury to spine.

1st one 17 year-old exposed to Firearm by assault from others the entrance of projectile from the back paraspinal area opposite S1 level, then it lodge to S1-S2 level left side radiologically.

2nd patient was 37 year-old exposed to Firearm, the bullet entrance from abdomen then lodge at level L5- S1 right side.

3rd case exposed to gunshot injury in ware the entrance was in the back para median opposite D12 and bullet demonstrated radiologically on D12.

All patients were admitted to hospital pre operation assessment, examination and investigation done, diagnostic imaging of spine by X-ray and computed CT-scan.

Results: Regarding the age distribution among 3 patients between 17-45 years, they are males) we see motor and sensory more affected than sphincter, back pain occur in one case only. All patients were surgically treated for extraction of firearm projectiles. No mortality in our study.

Conclusion: The ideal management of firearm injury to spine remains a matter of controversy.

We Recommend: Further studies with larger number of patients.

Key Words: *Firearm injury of the spine – Infection – Bullet – Sciatica.*

Introduction

OCCURANCE of firearm injury in the civilian population has been increased in recent years, due to difficulties in management of firearm injuries to spine and debates make it a devastating injuries.

Firearm injury to the spine was common matter in military population but now start to increase in civilians due to availability of firearms of low velocity either licensed or illegal representing about 13% to 17% of all spinal injuries [1].

Firearm injury of spine is the third most common cause of spine injuries after fall from height and road traffic accident [2].

Patients and Methods

This study include 3 male patients exposed to Firearm injury to spine, during 2016. Two of them at Hadramoot, Yemen and one patient at Assiut, Egypt.

1st one 17 year-old exposed to Firearm by assault from others the entrance of projectile from the back paraspinal area opposite S 1 level, then it lodge to S1-S2 level left side radiologically.

2nd patient was 37 year-old exposed to Firearm, the bullet entrance from abdomen then lodge at level L5-S 1 right side.

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All patients were admitted to hospital pre operation assessment, examination and investigation done, diagnostic imaging of spine by X-ray and computed CT-scan.

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All patients underwent to surgery by general anesthesia.

1st case operated after 1 month post exposed to gunshot on prone position under general anesthesia midline back incision done at level of S 1-S2, C. Arm X-ray help us on determine the level of bullet to detected the bullet was difficult by several X-ray shots the level is detected but bullet not found we make partial laminectomy foraminotomy then exposed nerve root and catch it by pionit non tooth forceps.

Then imaging by C-R done the bullet appear between the limbs of forceps engulf by tissue adhesion with nerve root, we use small needle of syringe to feeling it, and hearing the sound of needle on bullet, then wide the incision and take it by non-tooth forceps.

2nd case after exposed to Firearm in abdomen goes to general surgery specialist and underwent to laparotomy after 6 months he came complaint of right sciatica under general anesthesia on prone position laminectomy of L5 done then bullet found in neural canal beside the nerve root and com-

pressed it medially and up word after protected the nerve root and retracted it by dissector remove the bullet.

3rd case underwent to operation for reach to the bullet inside the body we use the screw until the reach to it, then pushed bullet to disc space after that catch it by artery forceps then remove it, after that filling the tract by bone ships and fixation one level above and below.

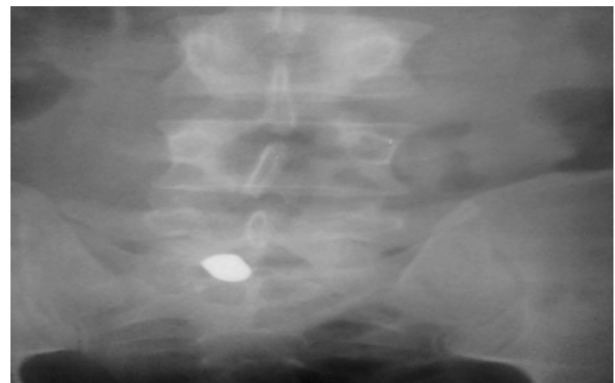


Fig. (1): Show bullet on X-ray.

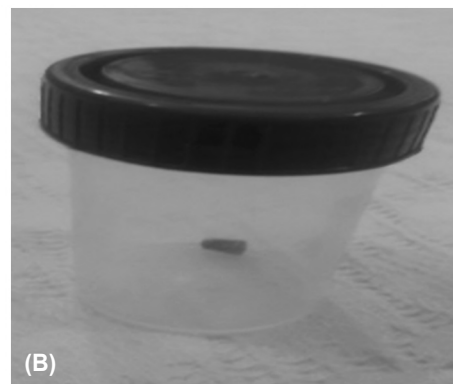
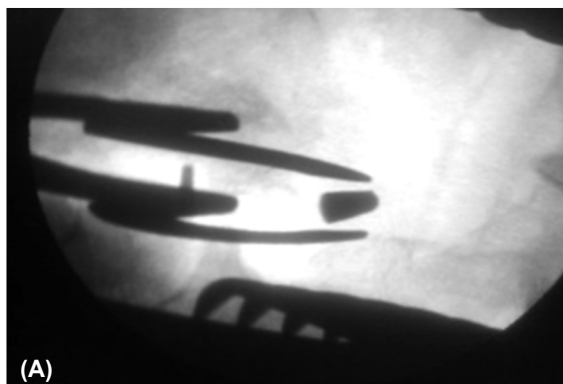


Fig. (2): (A) Forceps catch nerve and small bullet inside its sheet. (B) Bullet after removed.



Fig. (3): Demonstrate pre and post removed bullet.

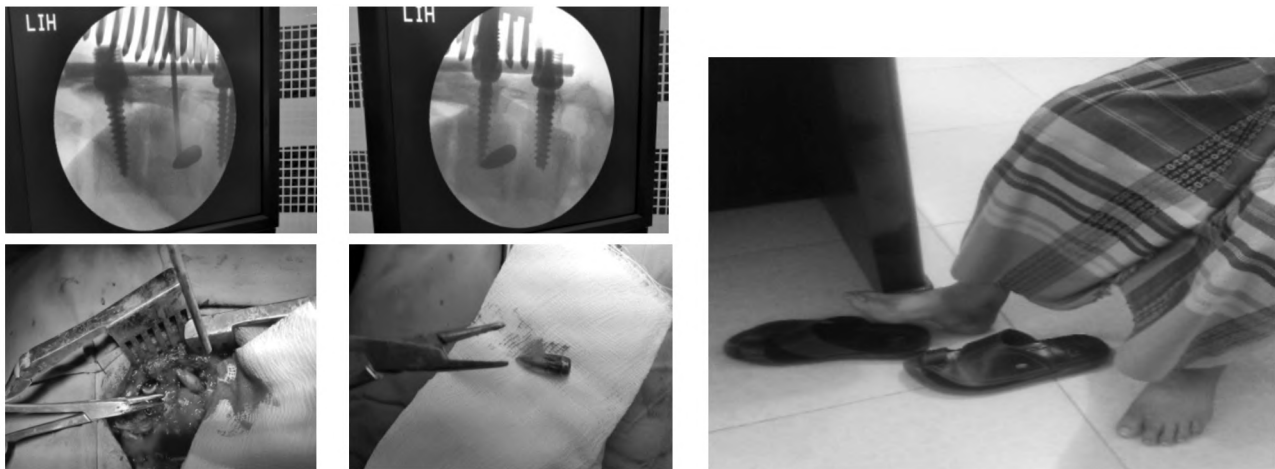


Fig. (4): Demonstrate the level of bullet and how to push it to disc space then removed it.

Results

Regarding the age distribution among 3 patients between 17-45 years, they are males.

From anatomical localization seen sacral region is the most common site for firearm injury.

In Table (3) we see motor and sensory more affected than sphincter, back pain occur in one case only.

Table (1): The demographic data of patients.

	Age	Sex
1st	17 years	Male
2nd	37 years	Male
3rd	45 years	Male

Table (2): Anatomical localization of bullet.

1st case	S1-S2
2nd case	L5-S1
3rd case	D12

Table (3): Clinical presentation.

	1st case	2nd case	3rd case
Back pain	Negative	Negative	Positive
Leg pain (sciatica)	Positive	Positive	Negative
Motor deficit	Positive	Positive	Negative
Sensory	Positive	Positive	Negative
Sphincter	Negative	Negative	Negative

Discussion

Post traumatic infection in firearm injuries commonly occur in the lumbar spine followed by the thoracic and cervical spines in frequency [3].

Lumbar spine is more susceptible to infection in firearm injuries due to bullet pass through gastrointestinal tract [4].

But in our study 2nd case of abdominal injury and laparotomy no seen septic complication not similar to results were reported by waters, Kihtir and Venger, et al. [5,6,7].

Inspite of potential contamination from a perforated organ or hollow viscous, neurosurgical attempt for bullet removal may carry higher risk of complication.

Cerebrospinal fluid leak and dural tear are risk for meningitis.

Broad-spectrum antibiotics should be started immediately, regardless of injury location and the results of wound culture which has limited utility in this setting [8,9].

Avoidance lack of efficacy and steroids should be included in the management plan for patients exposed to spinal firearm injuries [8-10].

To locate the fragments of the bullet and to detect fractures plain radiographic should be done.

This should be followed by computed tomography (CT) must be done after X-ray as it investigation of choice to precisely locate bullet fragment and fractures within spinal canal [8], this similar to plan of treatment of our cases.

References

- 1- FARMER J.C., VACCARO A.R., BALDERSTON R.A., ALBERT T.J. and COTLER J.: The changing nature of admissions to aspinal cord injury center: Violence on the rise. J. Spinal Disord, 11: 400-3, 1998.
- 2- MILLER C.A.: Penetrating wounds of the spine. In: Wilkins R.H., Rengachary S.S., editors. Neurosurgery. Vo. 2. San Francisco: McGraw-Hill Book Co., p. 1746-8, 1985.
- 3- VELMAHOS G. and DEMETRIADES D.: Gunshot wounds of the spine: Should retained bullets be removed to prevent infection? Ann. R. Coll. Surg. Engl., 76: 85-7, 1994.
- 4- MILLER B.R. and SCHILLER W.R.: Pyogenic Vertebral osteomyelitis after transcolonic gunshot wound. *Mil Med.*, 154: 64-6, 1989.
- 5- WATERS R.L., ADKINS R.H., YAKURA J. and SIE I.: Profiles of spinal cord injury and recovery after gunshot injury. Clin. Orthop. Relat. Res., 267: 14-21, 1991.
- 6- KIHTIR T., IVATURY R.R., SIMON R. and STAHL W.M.: Management of trans-peritoneal gunshot wounds of the spine. J. Trauma, 3: 1579-83, 1991.
- 7- VEGER B.H., SIMPSON R.K. and NARAYAN R.K.: Neurosurgical intervention in penetrating spinal trauma with associated visceral injury. J. Neurosurg., 70: 514-8, 1989.
- 8- BONO C.M. and HEARY R.F.: Gunshot wounds to the spine. Spine J., 4: 230-40, 2004.
- 9- GUSTILO R.B.: Current concepts in the management of open fractures. Instr. Course Lect., 36: 359-66, 1987.
- 10- HEARY R.F., VACCARO A.R., MESA J.J., et al.: Steroids and gunshot wounds to the spine. Neurosurgery, 41: 576-83, 1997.

إصابة طلق نارى للعمود الفقرى تجربة سريره والنتائج الجراحية

الهدف: لمناقشة المسببات والتشخيص ونوع العلاج فى المرضى المعرضين لإصابة سلاح نارى فى منطقة العمود الفقرى.

الخلفية: ازدادت الإصابة بإصابات بالأسلحة النارية فى السكان المدنيين زيادة ملحوظة فى السنوات الأخيرة، وأصابت أعيرة نارية فى العمود الفقرى مدمرة بشكل خاص لأن الإدارة المثالية لإصابات أعيرة نارية فى العمود الفقرى تظل مثار جدل.

الطرق: تشمل هذه الدراسة ٣مرضى ذكور تعرضوا لإصابة نارى فى العمود الفقرى أول شخص يبلغ من العمر ١٧ عاما يتعرض لسلاح نارى من خلال اعتداء من الآخرين على مدخل قذيفة من منطقة بارباسين الخلفية المقابلة لمستوى الفقرة العجزية الأولى، ثم يلجأ إلى المستوى الأيسر ما بين الفقرة العجزية الأولى والثانية بالأشعة السينية. كان المريض الثانى يبلغ من العمر ٣٧ عاما وقد تعرض للنيران، وهو المدخل الرصرصى من البطن، ثم نزل فى المستوى ما بين الفقرة القطنية الخامسة والعجزية الأولى. الحالة الثالثة التى تعرضت لإصابة بطلق نارى فى وير كان المدخل فى الجزء الخلفى المتوسط مقابل الفقرة الصدرية الأخيرة والرصاصه تظهر إشاعيا على الفقرة الصدرية الأخيرة. تم قبول جميع المرضى فى المستشفى قبل تقييم العملية والفحص والتحقيق القيام به، التصوير التشخيصى للعمود الفقرى بواسطة الأشعة السينية والتصوير المقطعى المحوسب.

النتائج: فيما يتعلق بالتوزيع العمرى بين ٣مرضى تتراوح أعمارهم بين ١٧ و ٤٥ عاما، فهم ذكور. نرى الحركية والحسية أكثر تأثرا من العضلة العاصرة، تحدث آلام الظهر فى الحالة واحدة فقط. تم العلاج لجميع المرضى جراحيا من استخراج القذائف النارية. لا وفيات فى دراساتنا.

الخلاصة: تبقى الإدارة المثالية لإصابة سلاح نارى فى العمود الفقرى مسألة مثيرة للجدل نوصى بإجراء مزيد من الدراسات مع عدد أكبر من المرضى.