Gunshot Injury with Facial Palsy: An Unusual Case

Anju Chauhan^{1,2} · Anoop Raj¹ · P. K. Rathore¹ · Ravi Meher¹ · Samuel Rajan¹

Received: 24 February 2015 / Accepted: 15 April 2015 / Published online: 21 April 2015
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Abstract As the use of firearms has become increasingly common in the civilian society, the incidences of homicidal as well as suicidal firearm injury have increased several folds. We here present an interesting case of celebratory firing which accidentally caused injury in the head & neck region and an unusual trajectory adopted by the bullet which prevented a fatal outcome.

Keywords Gunshot · Bullet · Facial palsy · Firearm

Introduction

Trauma is the second most common cause of facial nerve paralysis representing 15 % of all cases. There are many different types of trauma that lead to facial paralysis—temporal bone fractures, penetrating trauma and iatrogenic trauma. Penetrating injury typically affects the extratemporal segments of the facial nerve. However, gunshot wounds will cause both intratemporal and extratemporal injuries. Gunshot wounds to the temporal bone result in facial nerve paralysis in 50 % of cases. This type of injury usually results in a much worse outcome than other types of trauma secondary to the fact that gunshot wounds typically result in a mixture of avulsion and blunt trauma to

different portions of the nerve at the same time. We present an unusual case of facial palsy caused due to gunshot wound and its management.

Case Report

A 20 years old female presented to ENT Emergency with history of gunshot injury sustained 5 days back at a wedding. She presented with complaints of pain behind the right ear, hearing loss in right ear, incomplete closure of right eye and deviation of angle of mouth to left side. On examination there was an ill-defined diffuse fullness over right mastoid region (approx. 3 × 3 cm) with overlying skin erythema and a lacerated wound (entry wound) measuring 1.5 × 1.5 cm, 1 cm behind retro-auricular groove. Ear examination revealed step deformity along anterior and inferior canal wall with blackening of canal skin (soot deposition). Tympanic membrane was intact with black discoloration. Slight fullness was present over left submandibular area. On palpation, a hard, tender and ill-defined mass was felt just underneath the ramus of mandible.

There was right LMN facial paresis (House Brackman grade IV). Audiometry showed profound sensorineural hearing loss on the right side. Electroneuronography showed no recordable potential. X-ray face and neck revealed a rod shaped foreign body (bullet) just below the left ramus of mandible (Figs. 1, 2). CECT Face and neck showed multiple hyperintense spots in the middle ear with a rounded hyperintense foreign body (bullet) below left ramus (Fig. 3).

Patient was planned for surgery for removal of bullet via submandibular approach and extratemporal facial nerve exploration. A bullet (3 cm long) was removed from left submandibular region (Figs. 4, 5). Debridement of the

✉ Anju Chauhan
anju2716@gmail.com

¹ Department of ENT and Head & Neck Surgery, Maulana Azad Medical College and Associated Lok Nayak Hospital, New Delhi, India

² E-14, M.D.I Campus, Mehrauli Road, Sukhrali, Gurgaon 122001, Haryana, India

Fig. 1 X-ray face (AP view) showing bullet in submandibular region

Fig. 2 X-ray face (lateral view) showing orientation of bullet

Fig. 3 CT scan showing bullet (*white arrow*) and multiple pellets (*black arrow*)

Fig. 4 Bullet in left submandibular region

entry wound of the bullet was done, right main facial nerve trunk was found intact.

Following this, right facial nerve decompression was done using transmastoid facial recess approach. Fractured bony fragments and spicules were present along the anterior and inferior walls of external auditory canal were removed. Polypoidal mucosa with multiple pellets were present in middle ear and region of oval window were removed (Fig. 6). Tympanic segment of facial nerve near the 2nd genu was found exposed with bony spicules impinging the nerve. Spicules were removed and sheared facial nerve sheath was approximated and area sealed using blood clot. At 6 months follow up patient's facial nerve has improved marginally (HB grade 3).

Discussion

Facial nerve injury is one of the most common neurologic sequelae of a gun shot wound to head and neck region [1]. Penetrating injury typically affects the extratemporal segments of the facial nerve. However, gunshot wounds will cause both intratemporal and extratemporal injuries. It is the most lethal of penetrating injuries, about two-thirds die on the scene and they are the proximal cause of death in 52–95 % of victims [2].

In this case the entry wound of the bullet was on the right retroauricular region whereas the bullet was recovered from the left submandibular region, signifying that the bullet after hitting the temporal bone traveled through the retropharyngeal space without involving the spinal cord to reach the opposite side, thus a miraculous escape for the patient and a very rare occurrence.

The onset of the paralysis in regard to the timing of the trauma and the degree of the paralysis are the two most important prognostic criteria in cases with facial nerve injuries [3]. Surgical exploration should be performed as soon as possible in cases of complete paralysis of immediate onset since long delays increase the chance of

Fig. 5 Bullet (3 cm)

Fig. 6 Multiple pellets in EAC and middle ear

traumatic neuroma and a more profound scarring around the facial nerve. In cases with total nerve transection, the most favorable outcome will not be better than HB grade 3 [4].

The prognosis of facial paralysis in gunshot traumas is poor. Gunshot injury commonly leads to a situation in which the temporal bone has multiple small fractures and bullet fragments remain. Since it is not always possible to remove all these fragments, post-operative ear infection frequently occurs. A canal wall-up technique is the method of choice in any temporal trauma. However, because of the extent of the fractures and number of bullet fragments

typically seen in gunshot wounds, these cases often require the use of canal wall down technique [5].

In this case, we managed the patient with a transmastoid facial recess approach to remove the bony spicules, decompress the facial canal and reapproximate the sheared ends of the nerve. Since there was no tissue loss cable grafting was not needed.

Primary end-to-end neurorrhaphy is the preferred management for transection injuries. Secondary facial reanimation procedures, such as cranial nerve crossovers, dynamic muscle slings or various static procedures, are useful adjuncts when initial facial nerve repair is unsuccessful or impossible [6].

Conflict of interest Anju Chauhan, Anoop Raj, P.K. Rathore, Ravi Meher, Samuel Rajan declare they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards with the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was taken from the participant included in the study.

References

1. Qiu WW, Yin SS, Pate WE, Hardjasudarma M, Stucker FJ (1994) Neurotologic evaluation of facial nerve paralysis caused by gunshot wounds. *Otolaryngol Head Neck Surg* 111(4):446–449
2. Kaufmann HH (1993) Civilian gunshot wounds to the head. *Neurosurgery* 32:962–964
3. Ulug T (2005) Arif Ulubil S: management of facial paralysis in temporal bone fractures: A prospective study analyzing 11 operated fractures. *Am J Otolaryngol* 26(4):230–238
4. Bento RF, de Brito RV (2004) Gunshot wounds to the facial nerve. *Otol Neurotol* 25(6):1009–1013
5. Ozgirgin ON, Ozluoglu Levent N (2006) Facial nerve injuries revisited. *Mediterr J Otol* 3:127–132
6. Davis RE, Telischi FF (1995) Traumatic facial nerve injuries: review of diagnosis and treatment. *J Craniomaxillofac Trauma*. Fall 1(3):30–41