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Case report

Airgun shot wound to the orbit with retention of pellet. Case report and review of the literature

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ABSTRACT

Shot wounds become a growing clinical concern in the civilian setting, due to increasing popularity of air guns among minors. We present a pediatric case of a shot wound to the orbit with sparing of the eyeball and retention of airgun pellet in the retrobulbar space. The pellet was removed 3 months after injury via lateral orbitotomy. Pathophysiology and ballistics of shot wounds are briefly reviewed and current views on the management strategy of shot wounds with retained projectile are discussed.

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1. Case report

An 11 y.o. girl, with unremarkable previous medical history, was admitted to our facility on 18th October 2015 after suffering an accidental air gun shot. Admission findings included a small entry wound on the lower eyelid and edema of the conjunctiva of her left eye. Ophthalmological examination revealed a normal right eye, and on the left – slight elevation and blurred margins of optic disk, small subretinal ecchymoses, rupture of choroid and retina surrounded by multiple subretinal and intravitreous hematomas. Visual acuity was 1.0 on the right and 2/50 on the left. Emergency CT scan revealed a foreign body (air gun pellet of the "diabolo" type, Fig. 1) embedded in the inferior wall of the orbit lateral to the inferior orbital fissure, small intraorbital air bubles, with ocular globe and optic nerve appearing grossly intact. Conservative and symptomatic treatment resulted in uneventful healing of the entry wound and improvement of visual acuity in the left eye. The girl was discharged home in a good overall condition, with no general nor local signs of infection.

ENT and neurosurgical consultations were obtained in order to plan further treatment. Contemplated techniques for removal of the retained pellet included endoscopy via maxillary sinus and open orbitotomy (Figs. 2–4).

The girl was readmitted on 17th January 2016 for scheduled surgery. On admission she was in a good overall condition, neurologically intact, with no local nor systemic signs of infection. Local findings included healed scar in the inferior eyelid of the left eye, normal mobility of the globe, visual acuity of the left eye 0.5. The girl was operated on by lateral orbitotomy (Kroenlein). The pellet was located under fluoroscopic guidance. No signs of local infection were found. The pellet was removed without problem and the wound was closed in the standard fashion. Further postoperative course was uneventful and the wound healed with a satisfactory cosmetic result.

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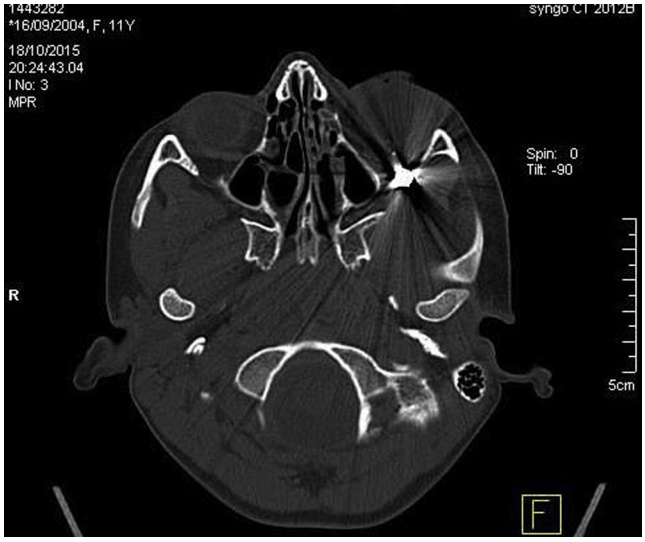

Fig. 1 – CT scan, transverse view. Intraorbital air gun pellet adjacent to the inferior orbital fissure (arrow).

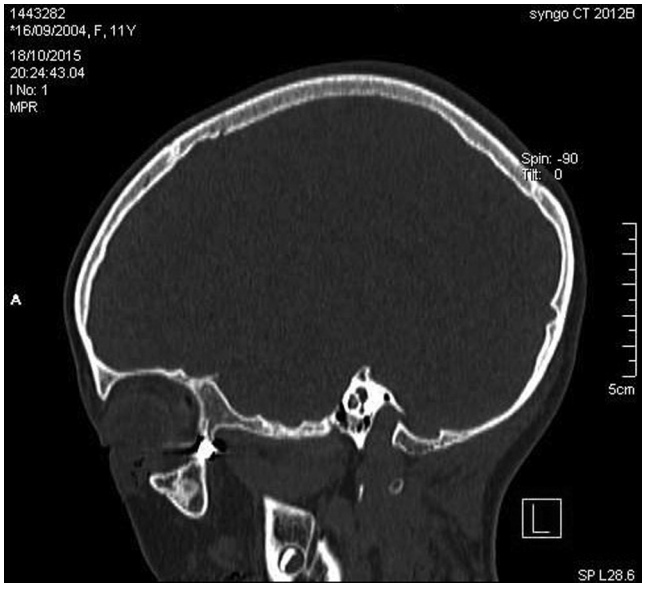

Fig. 2 – Same patient; CT scan, sagittal view.

2. Discussion

Increasing popularity of sport shooting and easy access to air guns will most probably contribute to growing incidence of accidental and purposeful air gun shot wounds in the near future. Regulatory limitations when buying an air gun delivering less than 17 kJ energy are very liberal. Only weapons delivering over 17 kJ require registration with the police, ophthalmologic examination and community interview [1]. At the place and time we currently live, shot wounds in the civilian setting are fortunately rare, but events accompanying preparation of this manuscript (March 2016, shortly after terrorist attacks in Belgium) might forecast a greater risk of shot wounds and other military-type injuries among civilians in the future. Medical personnel will be faced with this problem and should be able to manage these persons in the best possible way [2,3].

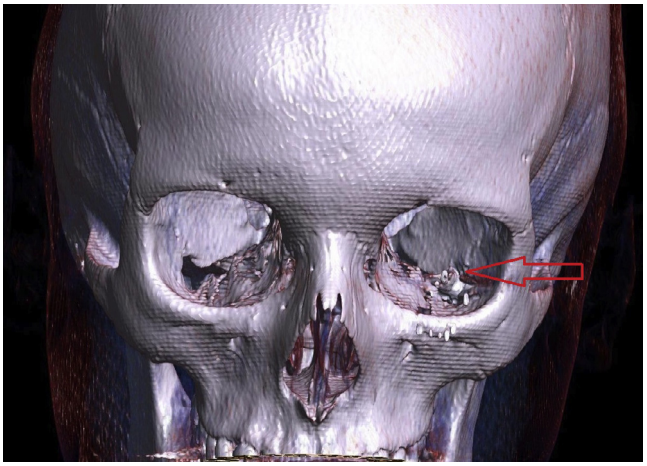

Fig. 3 – Same patient; CT scan, 3-D reconstruction. Intraorbital air gun pellet (arrow).

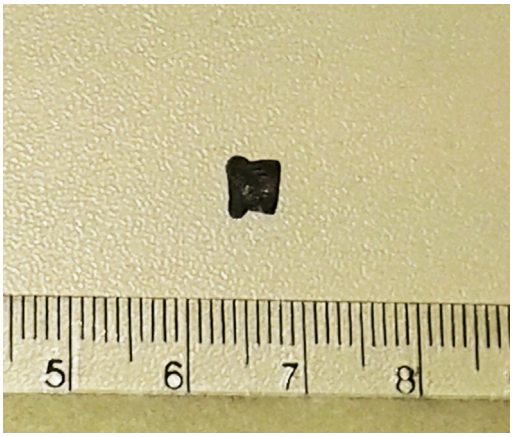

Fig. 4 – Recovered diabolo-type air gun pellet.

Our case deserves attention for several reasons. These include general strategy of management of shot wounds with and without retained bullet, timing and technique of surgery and collaboration of several medical specialties in the case of borderline location of injury.

A lot has been written to date on ballistics and pathophysiology of shot wounds [4,5], so the most basic issues will be addressed briefly. Currently observed trends in the development of firearms result in a definite differentiation of military and hunting rifles. In the military setting, a shot is designed to wound the enemy rather than to kill, because wounded soldier (or civilian) will require assistance, consuming far more resources in terms of material and man-power that a dead one. Therefore, a modern military bullet has high kinetic energy and relatively small caliber, ensuring greater penetration and smaller extent of tissue damage. Furthermore, smaller cartridges are lighter, thus facilitating transport of supplies to fighting troops. In the hunting setting, a shot is designed to provide a ''clean kill'', because prompt death of the

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