ocular abnormality, unilateral mydriasis is rarely due to an intracranial cause.[1] We found only one report of an intracranial aneurysm causing internal ophthalmoplegia without extraocular muscle involvement.[4] Pharmacological blockade is the most common cause of such a presentation. These pupils can be identified by their refusal to constrict with 1% Pilocarpine.[1] Adies pupil and trauma are other common causes. Once these are systematically excluded, benign episodic unilateral mydriasis should be considered a possibility.

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V Chadha, A Tey and P Kearns

Queen Margaret Hospital, Dunfermline, UK

Correspondence: V Chadha,
11 West Holmes Place,
Broxburn EH52 5NJ, UK
Tel: +44 07865081415.
E-mail: vchdh@aol.com

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Sir,

Ocular gunpowder injury

Gunpowder has been used for several years in firearms, explosives, cannons, and fireworks; however, there have been few reported cases of ocular injuries resulting solely from gunpowder. We treated a patient with penetrating ocular injuries caused by particles of smokeless gunpowder, the modern form of gunpowder.

Case report

A 47-year-old licensed firearms dealer suffered an explosion to his face and body while deactivating a cannon shell of the type used by UK Tornado jet aircrafts in on-board cannons (Figure 1a).

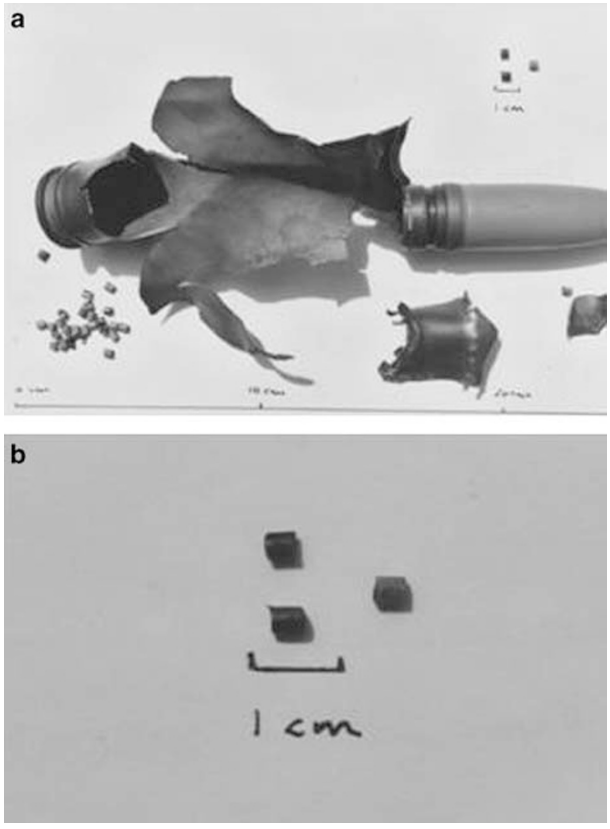

Figure 1 (a) The exploded cannon shell. (b) Gunpowder particles similar to the one removed from the eye.

He presented with a visual acuity of hand movements in the right eye and 6/18 best-corrected snellen VA in the left eye. A corneoscleral laceration was noted in the right eye at the 3 o'clock meridian associated with iris prolapse and a 4-mm hyphaema. The lens was opaque, obscuring the view of the retina. In the left eye, the cornea was mildly oedematous, there were multiple corneal abrasions, but fundal examination was grossly normal.

Orbital X-rays showed no radiopaque foreign bodies (Figure 2a). Primary repair of the right corneoscleral laceration was performed and, during examination under anaesthesia, a cylindrical particle was removed from the right inferior fornix (Figure 1b). As this was not visible on the original X-rays, the particle alone was X-rayed and was found to be radiolucent.

Postoperatively, a B-scan and CT scan of the orbits were performed. The B-scan showed a hyperechogenic area in the vitreous, which was presumed to be a vitreous haemorrhage. The CT scan showed an intraocular foreign body in the right globe in close proximity to the retina (Figure 2b). The patient was referred for vitreoretinal surgery and underwent a vitrectomy, lensectomy, removal of foreign body, and endolaser to a tear

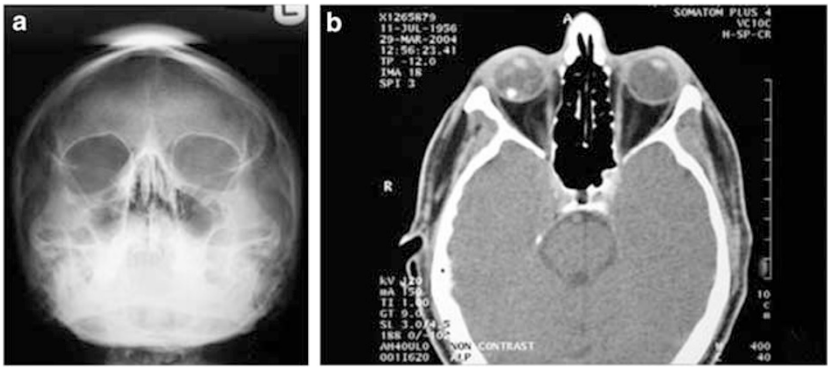

Figure 2 (a) Orbital X-ray. (b) CT scan showing a right intraocular foreign body.

detected intraoperatively. The foreign body removed was identical to the one found in the inferior fornix and was later identified to be a particle of smokeless gunpowder.

Comment

Smokeless gunpowder consists of almost pure nitrocellulose, frequently combined with nitroglycerin, which is reformed into small spherical balls, cylinders, or flakes using solvents such as ether.[1] They burn rapidly to produce hot pressurised gases capable of propelling a bullet or projectile.

A total of 20 eyes with gunpowder injury have been reported.[2–5] Four eyes were penetrated by a single particle of gunpowder.[2,3,5] In three of these cases, the particle came to rest within the vitreous without damaging the retina,[2,3] and in the remaining case, the particle was retained in the lens.[5] All of these were treated nonsurgically and no toxic ocular effects or chronic inflammation were reported. This suggests that retained gunpowder particles are well tolerated by the eye and do not always need removal. Surgical intervention is indicated in the presence of retinal and lens damage, as in our patient.

In all reported cases, the gunpowder particles were not visible on orbital X-rays. Where the ocular media are clear, the gunpowder particles can be seen on biomicroscopy and often no further imaging is performed. This case illustrates that CT scans are superior to X-rays and B-scans in identifying retained gunpowder particles. We therefore recommend that CT scans should be performed in cases of suspected gunpowder injuries, particularly if there are signs of globe perforation.

Conclusion

Injuries involving firearms, explosives, and cannon shells produce not only metallic pellets or bullets, but also release gunpowder residues at high force. These residues may not be radiopaque and can be missed unless a CT scan is performed.

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K Amin[1] and J Keenan[2]

[1]Royal Eye Unit, Kingston Hospital, Kingston-Upon-Thames, Surrey, UK

[2]Eye Department, Royal Surrey County Hospital, Guildford, Surrey, UK

Correspondence: K Amin,
Royal Eye Unit,
Kingston Hospital,
Galsworthy Road,
Kingston-Upon-Thames,
Surrey KT2 7QB, UK
Tel: +44 20 8546 7711;
Fax: +44 20 8934 3266.
E-mail: krinaamin@aol.com

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