DIAGNOSIS AND LOCALIZATION OF THE INTRA_ OCULAR FOREIGN BODIES

THESIS

Submitted in partial fulfilment for

the degree of Master of Science

IN

Ophthalmology

BY

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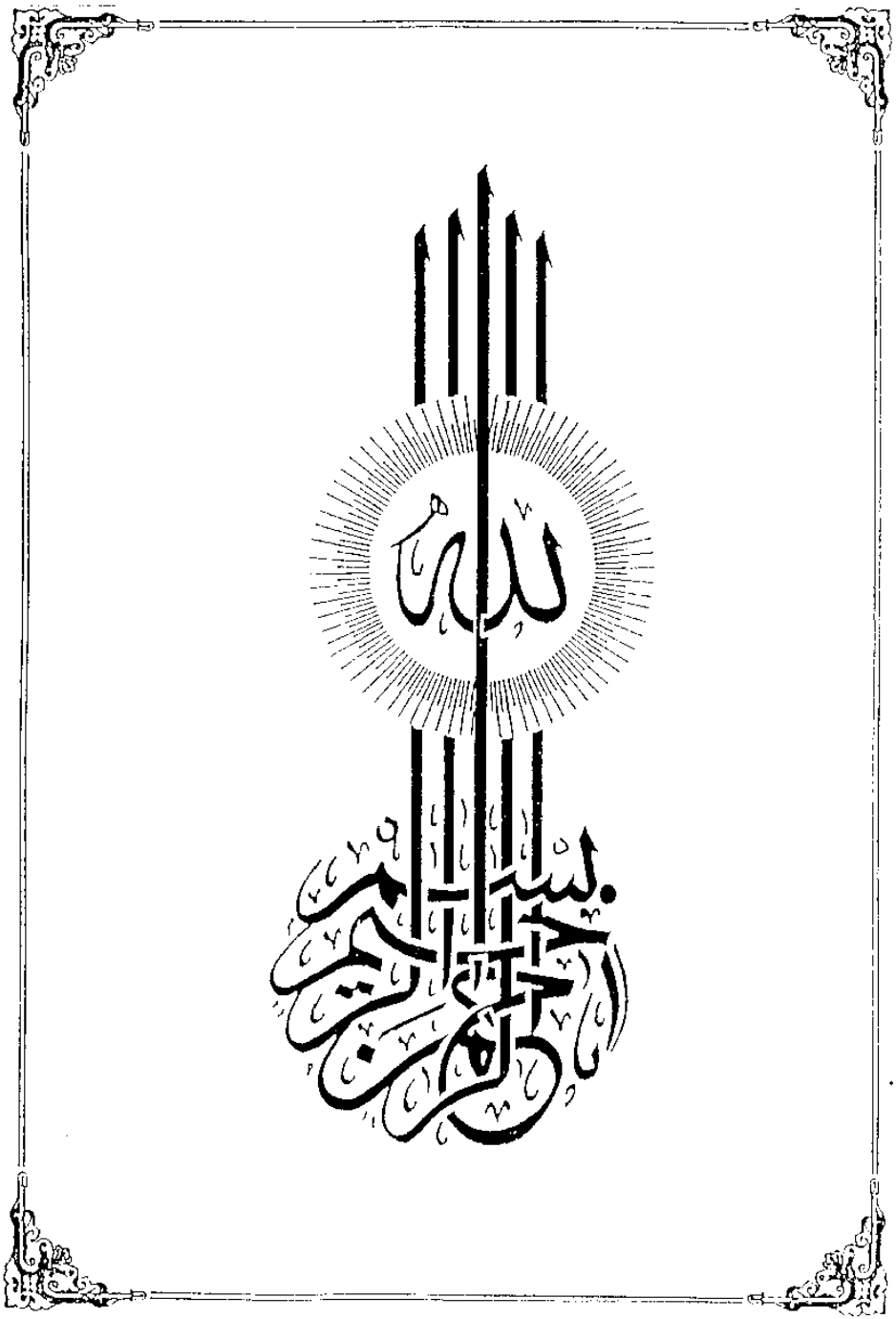
1987



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INTRODUCTION :

In all cases of perforating injuries, an intraocular foreign body should be suspected and care is taken to exclude this added complication. The localization of such a foreign body is equally important and needs techniques capable of giving the greatest accuracy ; when it is remembered that an inaccuracy of 1 mm may lead to a needless operation on the eye or involve the loss of this organ (Lloyd , 1973).

The majority of intraocular foreign bodies consist of small mettalic fragments which enter the eye during the working of metal in the industries and military communities ; and, the problems of these two groups have certain similarities and certain differences (Erkonen,1972;. In both, the incidence will be greater in males between the age of 18 and 40 years (Karlson , 1986). Most of the industrial accidents are,in a sense, self-inflected since they are the results of the patient's own action, wherease, the military injuries are usually the delibrate results of an enemy action (Wright et al,1975).

However, in the last few years, the fire works injuries have been a field of interest of many ophthalmologists allover the world-centres (Acccella , 1982). Wilson (1982) stated that in the last decade , the rate of injury has nearly triplled with ocular injuries accounting for up to one-third of all cases.

Several great studies have identified these fire works injuries as paricularly dangerous to the eyes; resulting in a high percentages of

contusion injuries , blindness and enucleation (Harris et al , 1983).

General Consideration About Foreign Body :

(1) Magnetic Properties :

Lloyd (1975) stated that in industry, about 90 per cent of foreign bodies are magnetic but, a small proportion consists of nonmagnetic alloys; as brass and copper fragments. Other types of nonmagnetic foreign bodies encountered are lead air-gun pellets and lead shots. Multiple foreign bodies which produce the most difficult localization problems, result from shot-gun injuries or from other forms of explosions. Wood, glass, stone fragments may also be demonstrated depending on their radio-opacity.

(2) The Side Involved :

Depending on the particular occupation at the time of injury, one or other eye will be relatively exposed and the other is relatively protected by the nose (Paton et al , 1976).

(3) The Size :

Runyan (1975) described that injuries from hammer and chisel,among the industrial cases,form the group with the smallest foreign bodies with an average of 2 mm^3 and a range of o.25 to 9.0 mm^3. Other injuries occuring when using a hand hammer show a larger size,but, the largest occurs with machine tool accidents in which the average size is 15.2

mm^3 with range from 0.56 to 16.2 mm^3.

(4) The Shape :

Penetration is most difficult for a blunt tip and least difficult for the knife-shaped tip.

Potts and Distler (1985) studied the way in which the shape of a missile,striking the eye,might affect the ease of penetration of the central cornea. The test objects were made to penetrate many pig's eyes restored to normal intraocular pressure by cannulation of the optic nerve and connection of the cannula to a manometric system of physiologic saline. The shape, size and weight of the missiles were carefully controlled. Missiles' speeds were measured photoelectrically; and, for each combination of weight and velocity, penetration of the missile was determined consistently by the point shape.

Figure 1 shows the different shapes of the missiles used by Potts and Distler.

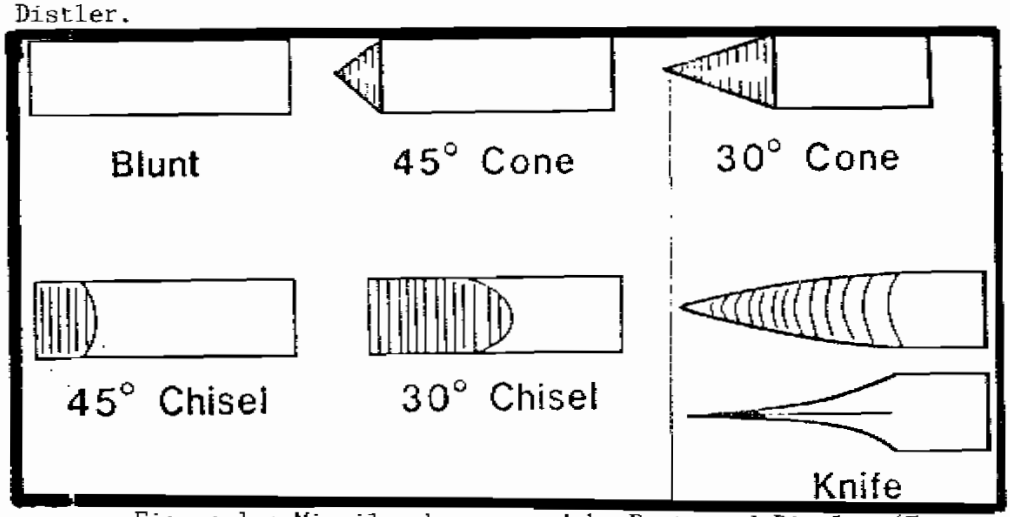

Figure 1 : Missile shapes used by Potts and Distler (From their paper, Am J Ophthal, 100 : 183 , 1985).

(5) The Final Position :

The final position in which a foreign body comes to rest will depend uppon the site of entery, the direction of its travel,its momentum and its gravitational force (Davidson,1968).

Since the vitreous body occupies the greater part of the globe, the majority of foreign bodies which enter the eye will be found in the vitreous; commonly gravitating so that they rest on the retina in the region of the equator (Tolentino et al,1976). Consideration of these points will make it clear that the small foreign body carrying just sufficient momentum to penetrate the cornea, is not likely to be found in the vitreous space; but, it will drop into the angle of the anterior chambre or become embedded in the iris or the lens capsule. On the other hand, large foreign bodies with greater momentum will pass through the lens or through the iris and lens or through the zonule and ciliary processes leaving the lens undamaged. They may become incarcerated in the ciliary body (Tolentino et al, 1976).

Murray (1952),in a review of 172 cases of intraocular foreign bodies found that :

- 60 per cent were lodged in the coats of the globe behind the equator,
- 10 per cent in the coats between the equator and the limbus,
- 7 per cent in the ciliary body,
- 10 per cent in the lens, lens capsule or suspensory ligament,
- 4.5 per cent in the iris,
- 2 per cent were mobile in the vitreous, and,
- 6.5 per cent consisted of superficial foreign bodies.

When localizing the intraocular foreign bodies, it is important to bear these figures in mind so that improbable anatomical localization is not made without very strong radiological evidence.