

Removing a Corneal Foreign Body with a Magnet

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Introduction

The removal of corneal foreign bodies is a common ophthalmologic procedure in the emergency department (ED) [1]. There are a few different techniques for removing corneal foreign bodies [2]. A cotton-tipped applicator is useful for superficial foreign bodies that can be swept away, but this does not work for adherent foreign bodies. For adherent corneal foreign bodies, the most common technique in the ED is to use a needle to dislodge the foreign body. Using a burr drill is also an option, but this device is less commonly available and may lead to significant epithelial damage.

The vast majority of corneal foreign bodies are metallic [3] and thus are frequently ferromagnetic. Consequently, it may be possible to use a magnet to remove most corneal foreign bodies. The use of a magnet has been described for removal of soft tissue foreign bodies [5,6] and nasal foreign bodies [7], but the use of a magnet to remove corneal foreign bodies in the ED has not been studied. In a letter to the editor [4], it was suggested that magnetized forceps might be used to remove a corneal foreign body, but this technique never became commonplace.

There is literature supporting magnetic extraction of intraocular metallic foreign bodies [8,9,10].

Thus, we propose a prospective study to assess the effectiveness of a rare earth magnet to remove corneal foreign bodies.

Methods

This will be a prospective interventional study to assess the use of a rare earth magnet for the removal of corneal foreign bodies. Patients may be included if they are over 18, and present to the emergency department with a metallic corneal foreign body. Patients will be excluded if they are prisoners, pregnant women, have pacemakers, have metallic facial implants, or if there is any suspicion of a globe rupture.

After the patient sign written, informed consent, the physician will attempt to remove the corneal foreign body with an N45 3" x 1/2" x 1/4" Neodymium bar magnet OR the North by Honeywell 326734G Eye Magnet with Loop. The treating physician will make sure that there are no magnetic objects within one foot of the patient's eye while the magnet is being used for this procedure. If the physician is unable to remove the corneal foreign body with the magnet, he or she may proceed with standard care.

Only the investigators of the study who have established an agreed upon method for this technique will be allowed to perform this procedure. The patient will be asked to remove any metallic nose, ear, or facial jewelry prior to the procedure. The approach should be parallel to the floor and at the height of the foreign body. This approach should minimize the risk of the foreign body sliding on the surface of the eye. The magnet will be brought next to the foreign body and then it will gently touch the foreign body. If that does not result in the foreign body latching onto the magnet, the attempt to remove the foreign body with the magnet will be discontinued.

The treating physician will fill out a brief data collection form for each patient including the patient's age and gender, the type of substance thought to be on the patient's cornea, the time since the incident, whether or not the technique was successful, whether or not there was increased fluorescein uptake after the attempt with the magnet, whether or not the patient experienced discomfort with the procedure, and (if the magnet did not remove the corneal foreign body) other techniques used to remove the corneal foreign body.

The primary outcome will be the percentage of patients with metallic corneal foreign bodies in whom the foreign body was successfully removed. Secondarily, we will assess to see if this technique results in any adverse outcomes such as discomfort to the patient or epithelial damage to the surface of the eye. As this technique has never before been studied in the ED, we intend to enroll 10-20 patients.

References

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