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Case Report

Unusual case of dystrophic calcification mimicking infective keratitis post cataract surgery- Managed with lamellar keratoplasty

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Abstract

Introduction: To report a case of dystrophic calcification mimicking infective keratitis managed with lamellar keratoplasty.

Materials and Methods: A 75yr old patient, one month post eventful (DMD) cataract surgery presented to us with diminution of vision RE. She was on post op prednisolone phosphate eye drops lost to follow up.

Results: On examination non healing epithelial defect was noted with dense whitish opacities in the central and paracentral parts of full thickness corneal stroma mimicking infective infiltrate deposits. On anterior segment OCT deposits appeared to be at deep stromal layer with clear demarcation along the descemets membrane hence underwent deep anterior lamellar keratoplasty.

Histopathology showed the presence of dystrophic calcification along the stromal tissue and no growth on culture. Patient was followed up regularly with final visual outcome of 6/18.

Conclusion: Dystrophic calcification of the cornea, involving corneal stroma is most commonly seen in chronic uveitis, prolonged use of medications over years. Our case shows high index of suspicion must be kept in patients with phosphate medication even for short period of time. AS OCT plays an important role in the decision of lamellar keratoplasty over PKP. With due deligence and use of recent advanced equipments treatment with simple lamellar keratoplasty was possible instead of full thickness keratoplasty avoiding long term visual rehabilitation complications.

Introduction

Corneal calcification occurs in wide range of conditions ranging from simple age related dryness to complete calcification threatening the vision. Calcification can be pre-existing primarily among patients or present secondary to chronic dry eye, ocular inflammations.[1] Bowman's layer and superficial anterior stroma are common sites of deposition.[1,2] Full thickness corneal stromal calcification is a rare potential complication which is not well documented. We hereby describe an unusual case of calcareous degeneration with intrastromal corneal deposition after topical steroid therapy following cataract surgery.

Case Report

A 75yr old female who presented with right eye diminution of vision since few months underwent regular small incision cataract surgery. Although intraoperatively uneventful patient had a small section descemet membrane detachment post-surgery. At the time of discharge patient had a vision of 6/9 hence was treated with 1% prednisolone sodium phosphate eye drops 8 times a day to be tapered weekly and 5% hypersol eye drops 4 times a day. She was asked for a weekly follow but the patient was lost to follow up.

She then presented one month later with complains of painless diminution of vision in right eye. She was on 1% prednisolone sodium phosphate eye drops 8 times a day to be tapered weekly and 5% hypersol eye drops 4 times. On examination documented vision was counting fingers @ 1m in right eye with minimal congestion. Non healing epithelial defect was noted with dense whitish opacities in the central and paracentral parts of cornea clinically mimicking infective infiltrate deposits. Posterior segment was within normal limits. Considering secondary infective keratitis due to steroid abuse as one of the differential diagnosis patient was planned for therapeutic keratoplasty.

On anterior segment OCT deposits appeared to be limited to deep stromal layer with clear demarcation along the descemet membrane in view of which deep anterior lamellar keratoplasty was attempted under antibiotic coverage. Specimen was partly sent for culture and partly for histopathology.

Histopathology showed the presence of non-infective dystrophic calcification along the stromal tissue which corresponded with absence of growth on culture media. Patient was followed up regularly with final visual outcome of 6/18 after appropriate visual rehabilitation.

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Fig. 1: Asoct

Fig. 2: Big bubble dissection

Fig. 3: Post op photo

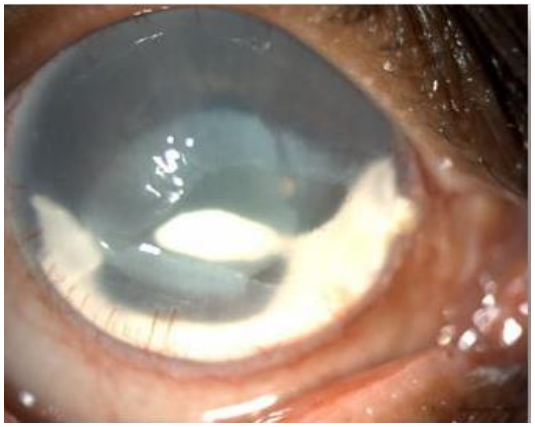

Fig. 4: Pre op slit lamp photography

Discussion

Infective keratitis following steroid abuse is a common finding in non-compliant patients. There are few documented reports showing calcium deposition after chronic use of topical steroid preparations, sodium hyaluronate artificial tear usage especially in patients with ocular surface diseases.[2-6] Band shaped keratopathy is the most classic form of calcification in cornea according to studies which is treated commonly with EDTA chelating agents.[1] Calcification involving the deep corneal layers is rare particularly after therapeutic medications. In our case on retrospective evaluation excessive steroid abuse along with hypertonic saline appeared to be the cause for dystrophic calcific deposits in the stroma.

Studies state calcium deposition can be initiated by (a) a local increase in calcium or phosphorus concentration or (b) crystals of calcium phosphate appearance in areas where the saturation limit has been exceeded.[6,7] Even under physiological conditions the concentrations of calcium cations and phosphate anions in aqueous humour and interstitial fluids are close to their solubility limits.[6,7] Thus, precipitation can occur with minor increase of either of these components.[6,7] Although in our patient there was no traceable increase in serum concentration of calcium or phosphate, as a result of inflammation a local increase of free calcium may have occurred following tissue or cell degradation.[6,7] Another possibility is that an increase in tissue pH secondary to an alteration of corneal metabolism causing precipitation of calcium.[6,7] The third possibility is the presence of phosphate buffers in the intraoperative solutions used in irrigating or postoperative medications.[6,7] In the presence of a large epithelial defect and an alkaline pH, rapid calcification has been documented as seen in chemical injury cases.[6,7] Based on these theories, it is plausible to suspect that eye drop preparations containing phosphate buffers may act similarly.[6,7] Studies hypothesize that a rapid precipitation of calcium phosphate occurs in predisposed individuals, steroid phosphate users and other topical ophthalmic medications containing phosphate where an increase in the concentration of this anion in tears is noted.[6-9] Serum and normal body fluids such as tears and aqueous humor contain calcium and phosphate concentrations that approach their solubility product.[6-9] Additional medications which contain phosphate may push the equilibrium towards formation of calcium phosphate, following the law of mass action.[4,6,7] Awareness among manufacturers and prescribers that topical preparations, high in phosphate may cause severe adverse effects when used very frequently specially on a damaged corneal surface is very essential.[6-9]

There are acrticles reporting topical medications and itsimplication in corneal calcium deposition.[4] Sporadic reports suspected that the preservatives phenylmercuric nitrate and thiomersal in retinoic acid, dexamethasone,[4] and timolol play a part in precipitation.[4] Phosphate buffers as part of an active steroid more likely to be associated with calcification similar to our case.[4] Delayed onset of calcification is more commonly reported in other

studies,[1,2,5,6] however in our case acute dystrophic calcification could be probably attributed to intra operative descemet membrane detachment with trapping of OVD or steroid abuse however over short duration.

Hence it is important to considered non infective causes for stromal deposits on early presentation also specially in cases of topical drug abuse.

Previous reports with hyaluronate induced calcium deposits have shown penetrating keratoplasty as the mode of treatment. In our case assessing the depth of involvement through anterior segment diagnostics helped in considering lamellar procedure over penetrating keratoplasty as it is known that the former has faster and better visual recovery.[2,4]

In our case visual rehabilitation was achieved in 3 months with patient improving to nearly immediate post-operative visual acuity in comparison to those patients who had undergone penetrating keratoplasty in previous studies.[2,4]

Conclusion

Dystrophic corneal calcification is frequently seen in chronic uveitis, prolonged use of medications over years mostly involving corneal stroma. Our case shows that high index of suspicion must be kept in patients with phosphate medication even for short period of time. Anterior segment diagnostics help in the decision of lamellar keratoplasty over PKP. With due diligence and use of recent advanced equipment's treatment with simple lamellar keratoplasty was possible instead of full thickness keratoplasty avoiding long term visual rehabilitation complications.

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