DOI: 10.7860/JCDR/2024/68873.19364

Case Report

Ophthalmology Section

A Case of Corneal Melt and Perforation Associated with Rheumatoid Arthritis Managed by Corneal Patch Graft

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ABSTRACT

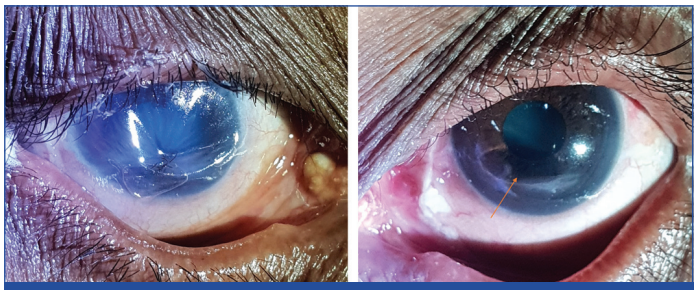
Corneal melt is a rare yet severe complication of Peripheral Ulcerative Keratitis (PUK), observed in patients with Rheumatoid Arthritis (RA). The mortality rate associated with corneal melt is high, warranting aggressive treatment. A 50-year-old female, a known case of RA for 20 years, presented with complaints of blurred vision, watering, irritation, and photophobia in both eyes for the last year, with worsening symptoms in the Right Eye (RE) for the past 15 days. She was diagnosed elsewhere in a private hospital with RE corneal melt and perforation and inferior corneal thinning in the Left Eye (LE), with an ulcer defect. She underwent corneal perforation suturing in the RE before reaching the present facility. On examination, a sutured corneal perforation was present in the RE, and corneal thinning and melt were seen para-centrally and inferiorly in the LE. Surgical treatment with RE corneal patch graft repair was performed. The patient was given oral methotrexate and prednisolone for aggressive systemic control of RA and to ensure the survival of the patch graft. The vision in the RE improved following the procedure, maintaining the tectonic integrity of the cornea. On follow-up, aleucomatous opacity was noted in the RE patch graft tissue. Corneal thinning in the LE was treated topically with artificial tears and antibiotic eyedrops, which eventually healed, forming macular corneal opacity. Overall, corneal patch graft repair enabled the maintenance of tectonic support and corneal integrity, as well as vision improvement in the patient with RA presenting with the complication of corneal melt and perforation.

Keywords: Blurred vision, Corneal opacity, Peripheral Ulcerative Keratitis, Photophobia

CASE REPORT

A 50-year-old female patient presented to the ophthalmology department with complaints of blurred vision, irritation, watering, and photophobia in both eyes for one year. The symptoms worsened in the Right Eye (RE) over the past 15 days, leading her to seek care at a private hospital where she was diagnosed with corneal melting and perforation para-centrally in the RE, and corneal thinning with an ulcer defect inferiorly in the Left Eye (LE). She underwent corneal perforation suturing in the RE before coming to the current facility. Her medical history revealed that she had been a known case of Rheumatoid Arthritis (RA) for 20 years and had been on irregular medical treatment. No other systemic illnesses were present.

Upon examination, the vision in the Right Eye (RE) was counting fingers at half a foot, with accurate Perception of Rays (PR) in all quadrants. In the Left Eye (LE), the vision was 6/60. Matting of eyelashes was observed in both eyes with sticky discharge. The slit lamp examination of the RE revealed a Bandage contact lens in place, normal conjunctiva, and three interrupted sutures on the cornea, located paracentrally between 6 and 7 O'clock, approximately 3 mm away from the inferior limbus [Table/Fig-1]. Descemet's membrane folds were present in a radiating pattern from the suture site, and corneal indentation was noted at the suture site. The anterior chamber was shallow at the periphery and collapsed at the suture site, with a small air bubble located superiorly covering less than 1/3 of the anterior chamber. Iris chafing was noted at 11-12 O'clock, and the pupil was hazily visible [Table/Fig-1]. The fundus could not be visualised in the RE. Examination of the LE revealed 6/60 vision, normal conjunctiva, and a corneal ulcer defect measuring 3×5 mm, involving half of the stromal thickness between 5 and 8 O'clock, approximately 3 mm away from the limbus [Table/Fig-2]. The anterior chamber and iris were within normal limits in the LE, and the fundus was hazily visible but within normal limits [Table/Fig-2].



[Table/Fig-1]: Sutured corneal perforation in Right Eye (RE) due to corneal melt, from 6-7 o'clock para-centrally, inferiorly, 3 mm away from inferior limbus, with corneal indentation at suture site due to collapsed anterior chamber.
[Table/Fig-2]: Corneal melt causing thinning and ulcer defect 2-3×5 mm inferiorly para-centrally from 5-8 o'clock, 3 mm away from inferior limbus in the Left Eye (LE). (Images from left to right)

All routine laboratory investigations were conducted, revealing a haemoglobin level of 11.2 gm/dL and a Total WBC count of 11200/cmm, slightly higher than the normal range of 4000-10000/cmm. The Rheumatoid factor, analysed using the latex advanced turbidimetric assay method with an EM 200 fully automated biochemistry analyser, was elevated at 124.6 IU/mL, compared to the normal range of 0-18 IU/mL.

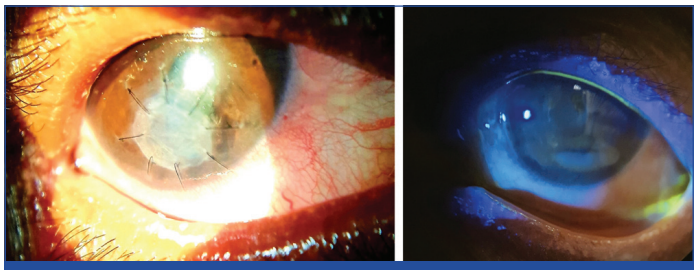
Following the examination, the sutured corneal perforation in the Right Eye (RE) due to RA was surgically treated with corneal patch graft repair under local anaesthesia to preserve and restore the corneal tectonic integrity. Three loosely interrupted sutures were cut using Vannas scissors. The borders of the perforation were evenly trimmed with Vannas scissors. A 4-0 trephine was utilised to harvest a donor corneal tissue, and the patch graft tissue was obtained. The graft tissue was sutured at the perforation site with eight interrupted sutures using 10-0 Ethicon suture. The patient was instructed to use artificial tears eye drops six times a day in both eyes and Gatiquine-P eye drops topically six times a day, with a tapering schedule (6 times-4 times-3 times-2 times-1 time-Stop). Additionally, the patient was prescribed oral

tablet Prednisolone 40 mg with a weekly tapering schedule (40 mg-30 mg-20 mg-10 mg-Stop). For systemic disease control, Methotrexate 7.5 mg tablets were initiated once daily for twice a week (every Saturday and Sunday) and continued. The corneal ulcer defect and thinning in the Left Eye (LE) were managed with artificial tears eye drops six times a day and antibiotic drops administered twice daily for one month.

On the fifth post-operative day, the patch graft in the Right Eye (RE) remained in place with all eight interrupted sutures intact. Mild oedema was observed at the graft-host junction, the anterior chamber was well formed, and the vision in the RE was 3/60. Perception of Rays (PR) was accurate in all quadrants. In the Left Eye (LE), the vision had improved to 6/36. Corneal thinning, involving one-fourth of the stromal thickness, measured 2×2 mm inferiorly from 5-7 O'clock, approximately 3-4 mm away from the limbus.

At the one-month follow-up, the patient's vision in the RE had improved to 6/60, with the ability to count fingers at half a foot. PR was accurate pre-procedure, and a nebular opacity was noted in the patch graft. The vision in the LE was 6/36, and the corneal melt and thinning had healed, leaving a macular corneal opacity measuring 2-3×4 mm para-centrally and inferiorly from 5 to 8 O'clock.

During the three-month follow-up, the vision in the RE was 6/60, and a leucomatous corneal opacity was observed on the patch graft [Table/Fig-3]. In the LE, the vision remained at 6/36 with a macular corneal opacity measuring 3×5 mm para-centrally and inferiorly from 5 to 8 O'clock [Table/Fig-4]. The patient continued using artificial tears in both eyes and taking Methotrexate 7.5 mg once daily, twice a week.



[Table/Fig-3]: A three-month postoperative photograph of Right Eye (RE) after corneal patch graft repair surgery, showing leucomatous corneal opacity in patch graft. **[Table/Fig-4]:** Sterile inferior corneal melt of Left Eye (LE) forming a macular corneal opacity, and absence of fluorescein stain uptake on slit lamp examination at three months follow-up. (Images from left to right)

DISCUSSION

Peripheral Ulcerative Keratitis (PUK) is a rare and serious complication of RA. In nearly 50% of cases, PUK is bilateral and typically occurs in the advanced stages of RA [1]. The mechanism of corneal melting involves the deposition of immune complexes in the peripheral cornea, leading to the occlusion of episcleral and conjunctival capillaries, followed by cytokine release and recruitment of inflammatory cells. In the context of RA, ulceration more commonly affects the peripheral cornea compared to the central cornea [2].

For the management of corneal perforations, surgical procedures such as conjunctival flaps, keratoplasty, amniotic membrane grafts, cyanoacrylate glue, or corneal transplants, along with medical therapy involving immuno-suppressants, steroids, and antibiotics, are performed, with favourable outcomes [3,4]. Shivanna Y et al., demonstrated the surgical technique of patch graft for a case of corneal melt with iris prolapse, resulting in improved vision for the patient [5], similar to the present case. Alternatively, Cyanoacrylate Tissue Adhesive (CTA) supported by Intracorneal Scleral Patch (ICSP) has also been used in managing RA-related corneal perforations [4]. Livny E et al., managed three cases similar to the present study using corneo-limbal covering grafts [6]. Awan MA and Ramaesh K utilised Superior Forniceal Advancement Conjunctival Pedicle (SFACP) among their patients to manage RA-associated corneal perforations [7].

While the present case did not involve any other co-morbidities, Shivanna Y et al., reported a case with type 2 diabetes mellitus that was untreated and had PUK in the eye that underwent cataract surgery [5]. Corneal melting following cataract surgery in RA patients has also been reported in studies from Mexico, Spain, and Greece [8-10]. At the time of diagnosis, the patient in the current study had no known predisposing factors, such as radiation treatment, which could increase the risk of neurotrophic keratopathy, severe dry eye disease, or infection. In contrast, Dervenis P et al., reported a history of eyelid radiation before corneal melting occurred, and Livny E et al., reported cases with a past history of penetrating keratoplasty [6,8].

The visual acuity of the patient in this study improved following the graft, with 6/60 in the RE and 6/36 in the LE. Previous studies have reported varying visual outcomes ranging from finger counting to 6/60 [6-8], although the follow-up periods differed. Singh G et al., reported a case of corneal melt in RA complicated by a superimposed MRSA infection, which was treated with a combination of antibiotics and anterior lamellar keratoplasty before initiating the immunosuppressive regimen [11].

CONCLUSION(S)

Corneal patch graft repair helped maintain the tectonic support and integrity of the cornea, leading to an improvement in vision for the RA patient with a complications of corneal melt and perforation. Along with restarting immunosuppressive therapy for RA, the procedure proved effective in enhancing outcomes with minimal complications.

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PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Dec 08, 2023
- Manual Googling: Feb 26, 2024
- iThenticate Software: Feb 29, 2024 (8%)

ETYMOLOGY: Author Origin

EMENDATIONS: 5

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Dec 06, 2023**
Date of Peer Review: **Feb 10, 2024**
Date of Acceptance: **Mar 02, 2024**
Date of Publishing: **May 01, 2024**