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Mooren's ulcer following extracapsular cataract extraction

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PURPOSE. *Prior cataract surgery is a recognized risk factor for the development of Mooren's ulcer, but the demographic and clinical features of a large cohort of such patients have not been described.*

METHODS. *The authors performed a retrospective review of demographic and clinical data from 14 eyes in 13 patients who developed Mooren's ulcer following extracapsular cataract extraction at Aravind Eye Hospital in Madurai, South India.*

RESULTS. *Eight (62%) of the 13 patients were men and 5 (39%) were women. The median age in our population was 65 years, with a range of 45 to 85 years. The median number of months from surgery to the onset of Mooren's ulcer was 19, with a range of 4 to 156 months. Of the 14 eyes with prior cataract surgery, the location of the ulcer was at or contiguous with the wound in 10 eyes (71%), which was 2.5 times more likely than other circumlimbal locations, and only one patient (8%) had bilateral disease.*

CONCLUSIONS. *Mooren's ulcer may occur following extracapsular cataract extraction and when it does it is most likely to be unilateral and contiguous with the wound. These findings support the notion that exposure of normally concealed corneal antigens may contribute to the pathogenesis of Mooren's ulcer in some patients. (Eur J Ophthalmol 2008; 18: 351-5)*

KEY WORDS. *Corneal ulcer, Marginal ulcer, Trauma, Surgery*

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INTRODUCTION

Mooren's ulcer was first described by Bowman in 1849 (1) and then by Mooren in 1867 (2). The diagnosis is usually based on characteristic clinical features, typically the presence of a painful, peripheral ulcerative keratitis associated with a steep, overhanging central or leading edge (3, 4). One or both eyes may be involved and either circumferential or central progression, often accompanied by perforation, is common. Without treatment, the end-stage result is a thinned, scarred, and vascularized cornea (3, 4).

The pathogenesis of Mooren's ulcer has not been well elucidated, but evidence suggests an autoimmune process with both cell-mediated and humoral components (3-5). Several inflammatory pathogenic pathways have been described, including the deposition of immune complexes in perilimbal vessels with activation of the complement system and collagenase release by attracted neutrophils and macrophages (3-5). Reactivity against normally sequestered corneal antigens, such as calgranulin C, has been hypothesized to be important in the pathogenesis of the disorder (6). Various mechanisms of triggering these autoimmune responses have been proposed based on epidemiologically identified risk factors, including systemic parasitic infestation and corneal surgery, trauma, or infection (7-13). HLA-DR17 positivity also appears to be a risk factor for the development of this condition (14, 15). While there have been isolated case reports of

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Mooren's ulcer following corneal transplantation and intracapsular cataract extraction (8-12), as well as clinic based studies showing an association between the development of Mooren's ulcer and prior cataract surgery (7, 16), there have be no specific reports or detailed descriptions of a large cohort of patients who developed Mooren's ulcer following extracapsular cataract surgery. In this article, we describe the demographic and clinical characteristics of 14 eyes in 13 consecutive patients who developed Mooren's ulcer following extracapsular cataract extraction. To our knowledge, this is the largest series of patients with Mooren's ulcer to be reported following corneal surgery and the first detailed description of this condition following extracapsular cataract excision.

METHODS

Internal Review Board approval was obtained. We performed a retrospective observational case series review of 70 consecutive patients seen at Aravind Eye Hospital in Madurai, South India, during a 1 year period. Mooren's ulcer was defined as an idiopathic, painful ulceration of the peripheral cornea with involvement of the corneoscleral limbus in the absence of scleral inflammation. In all cases, the clinician excluded other causes of peripheral ulcerative keratitis based on history, physical examination, and laboratory investigations as indicated. Of these 70 patients with Mooren's ulcer, 13 (19%) had a history of extracapsular cataract extraction with a superior cornea-scleral wound prior to the development of Mooren's ulcer in the operated eye. We reviewed the medical records of these patients and noted their age, sex, eye involved, and the time elapsed between cataract surgery and development of Mooren's ulcer. In addition, we noted whether the patient was aphakic or pseudophakic, the presence of any systemic diseases or prior history of trauma or infection, the location and extent of the Mooren's ulcer, and the treatment provided. We used a clock hour system to classify the location of the ulcer. A superior location spanned 10:30 to 1:30, nasal greater than 1:30 to 4:30, inferior greater than 4:30 to 7:30, and temporal greater than 7:30 to 10:30.

RESULTS

Demographic and clinical characteristics of our patient group are reported in Tables I and II. Seventy patients with a Mooren's ulcer were examined at Aravind Eye Hospital over a 1-year period, and 13 (19%) of these had a prior history of extracapsular cataract

TABLE I - DEMOGRAPHICS AND CLINICAL CHARACTERISTICS OF STUDY POPULATION

Patient	Sex	Age, yr	Aphakic (A) or pseudophakic (P)	Months from surgery to Mooren's ulcer	Eye	Ulcer contiguous with cataract surgery wound
1	F	65	P	29	R	Yes
2	F	70	A	24	R	Yes
3	M	45	P	6	R	Yes
4	M	65	A	36	R	No
5	F	55	P	6	R	Yes
6	F	72	P	24	R	Yes
6	F	72	A	14	L	Yes
7	M	67	A	108	L	No
8	F	40	A	8	L	Yes
9	M	61	P	4	R	Yes
10	M	85	A	120	L	No
11	M	60	P	8	L	Yes
12	M	75	A	156	L	No
13	M	62	P	8	R	Yes

Patient 6 had bilateral Mooren's ulcers following cataract extraction in both eyes

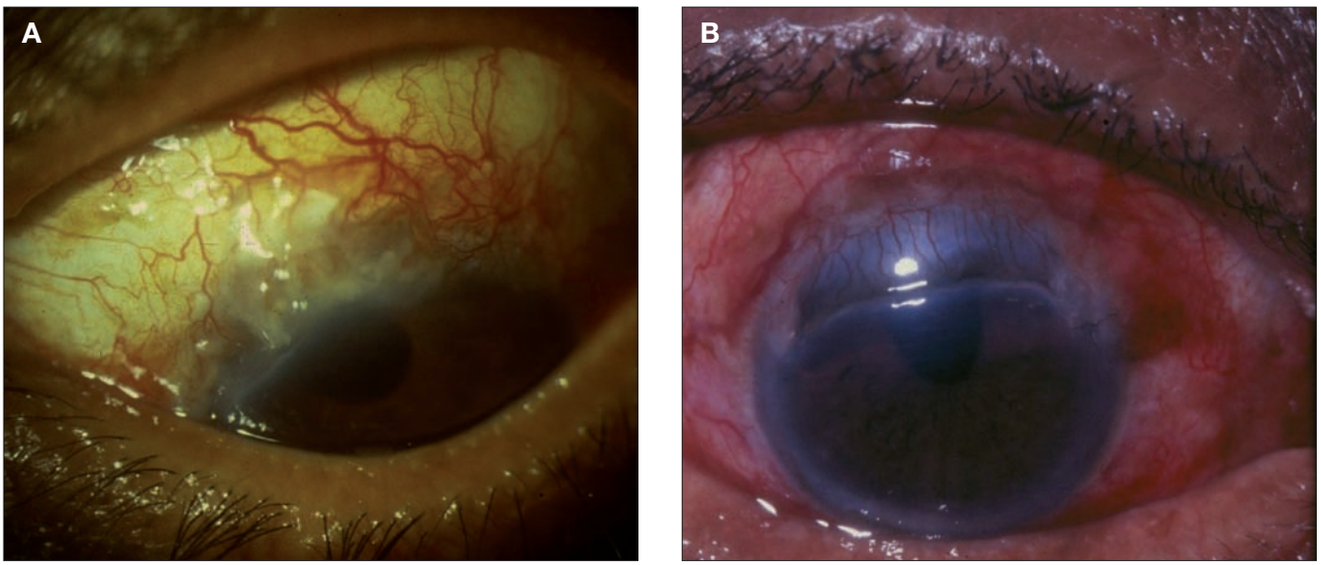

Fig. 1 - *Two representative patients* **(A, B)** *with Mooren's ulcer at the site of a prior extracapsular cataract extraction wound.*

TABLE II - CLINICAL CHARACTERISTICS OR MOOREN'S ULCER FOLLOWING CATARACT EXTRACTION

	Cases
Gender, n (%)	
Men	8 (61.5)
Women	5 (38.5)
Median age, yr	65
Age range, yr	45–85
History of systemic disease	2 (Diabetes mellitus)
Mean time from surgery to Mooren's onset, mo	39.4
Location of ulcer, n (%)	
Superior	10 (71.4)
Nasal	3 (21.4)
Temporal	8 (57.1)
Inferior	4 (28.6)
Treatment, n (%)	
Topical steroids	12 (85.7)
Systemic steroids	3 (21.4)
Conjunctival resection	8 (57.1)
Keratectomy	1 (7.1)
Glue for perforation	1 (7.1)
Patch graft for perforation	2 (14.3)
Enucleation for perforation	1 (7.1)

extraction. All of our patients underwent extracapsular cataract extraction with a 2% lidocaine retrobulbar block and a superior fornix based conjunctival flap. Wet field cautery was used for hemostasis and a minimum of 5 10.0 nylon sutures were placed in all cases. All patients received a standard postoperative regimen of topical antibiotic and corticosteroid, tapering over 2 months. Eight (62%) of our 13 patients were men, and 5 (39%) were women. Eight (57%) of the 14 eyes involved were on the right side and 6 (43%) were on the left side. The median age of our 13 patients was 65 years, with a range of 45 to 85 years. Two of the Mooren's ulcer patients had a history of type 2 diabetes mellitus, and none had any autoimmune diseases. There was no prior history of ocular trauma or infection. Half of the 14 Mooren's ulcer eyes were rendered pseudophakic and the other half were left aphakic following cataract extraction as they were unable to purchase an intraocular lens. None of the surgeries was complicated. The median number of months from surgery to the onset of Mooren's ulcer was 19 with a range of 4 to 156 months. In 10 out of 14 eyes (71%) that developed Mooren's ulcer following cataract surgery the ulcer was at or contiguous with the prior cataract wound. In addition, out of the 14 eyes with prior cataract surgery, the location of the ulcer was 2.5 times more likely to be superior and contiguous with the wound than to be inferior (Fig. 1, A and B). Of the 14 eyes that developed Mooren's ulcer, treatments rendered following the onset included topical corticosteroids in 12 eyes (86%), conjunctival resection in 8 eyes (57%), systemic corticosteroids

in 3 eyes (21%), patch graft for perforation in 2 eyes (14%), and keratectomy, glue for perforation, and enucleation for complicated perforation in 1 eye each (7.1%).

DISCUSSION

We have presented the demographic and clinical characteristics of 14 eyes of 13 consecutive patients diagnosed with Mooren's ulcer following extracapsular cataract extraction over a 1-year period at Aravind Eye Hospital, Madurai, South India. Our demographic data resemble those previously reported for patients with Mooren's ulcer in South India in that most of our patients were men and older than 50 years of age (7, 16). Of note, however, we observed a much higher rate of superior corneal involvement (71% vs 13%) and a much lower rate of bilateral involvement (8% vs 46%) in this consecutive series of patients who developed Mooren's ulcer following extracapsular cataract surgery as compared to a much larger, clinic based cohort from the same hospital, 22% of whom also gave a history of prior corneal surgery (16). It has been proposed that previous corneal injury or surgery may play a role in the pathogenesis of Mooren's ulcer, perhaps by exposing previously concealed corneal antigens to antigen-presenting cells, leading to an intense infiltration of plasma cells and lymphocytes in the area of corneal ulceration (3, 5, 7, 16). Previous articles have reported a statistically significant higher rate of corneal trauma or surgery in patients with Mooren's ulcer (7, 16) and there have been case reports of Mooren's ulcer following intracapsular cataract extraction and penetrating keratoplasty (8-12). To our knowledge, this is the largest series of Mooren's ulcer patients following cataract surgery and the first detailed description of the condition following extracapsular cataract extraction.

Studies have suggested that a host–parasite interaction may cause autoimmunity to corneal calgranulin C, a neutrophil protein that binds to paramyosin in parasite muscle (6, 17, 18). It is possible, therefore, that the corneal wound created during extracapsular cataract surgery may release normally sequestered calgranulin C, increasing the risk of an autoimmune reaction directed against this corneal antigen. The patients in our review were not tested for intestinal parasitic infections, so we are unable to comment on the specific role of parasitic infection in our patients who underwent surgery.

In all cases, the diagnosis of Mooren's ulcer was made clinically by an experienced cornea specialist at Aravind Eye Hospital and was clear based on history, review of systems, clinical examination, and directed laboratory investigations. None of our patients had any underlying autoimmune diseases. Clinical characteristics such as the presence of a steep, overhanging central or leading edge of the ulcer, and the development of a scarred, vascularized cornea with significant stromal thinning were used to support the diagnosis.

In our series, we observed a 2.5-fold greater tendency for Mooren's ulcer to develop at or contiguous with the surgical wound when it did develop following extracapsular cataract extraction. Ten out of 14 (71%) affected eyes developed Mooren's ulcer superiorly, while only 4/14 (29%) had an inferior or interpalpebral location; all of our cataract surgery patients had a superior cornea-scleral extracapsular wound. Of note, three of the four cases in which the ulcer was not contiguous to the cataract surgery wound had a significantly delayed onset of Mooren's ulcer following surgery. In these cases, it is possible that other factors unrelated to cataract surgery may have played a role in the pathogenesis of the ulcer.

In summary, Mooren's ulcer, although uncommon, is more likely to occur following cataract surgery and when it does occur it is most likely to be unilateral and to involve that portion of the peripheral cornea contiguous with the prior surgical incision. The interaction between prior cataract surgery and other risk factors for the development of Mooren's ulcer, including intestinal hookworm infestation and HLA-DR17 antigen expression, has yet to be explored.

Proprietary interest: None.

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