



ORIGINAL RESEARCH PAPER

Ophthalmology

FACTORS CAUSING RECURRENCE OF INFECTION IN THE CORNEAL GRAFT AFTER THERAPEUTIC PENETRATING KERATOPLASTY

KEY WORDS: Corneal graft, Therapeutic penetrating keratoplasty, Fungal keratitis, TPK.

Dr Rohit

JR, Upgraded Department of Ophthalmology LLRM Medical College, Meerut (UP)

Dr Lokesh Kumar Singh*

Assistant Professor, Upgraded Department of Ophthalmology LLRM Medical College, Meerut (UP). *Corresponding Author

ABSTRACT

Aim:-The aim of this study is to analyse the factors causing recurrence of infection in the corneal graft after therapeutic penetrating keratoplasty. **Material and Methods:-** This study was conducted at Upgraded Department of Ophthalmology, SVBPH, Meerut. This institution performs 120 keratoplasty procedures per year on an average. The study was conducted for a period of one year & 25 patients had reinfection and those who presented with reinfection constituted the sample size complete enumeration. The data thus obtained was compiled and analysed using Statistical Package for Social services (SPSS vs 20). The qualitative variables were analyzed by using frequencies and The qualitative variables were analyzed by using frequencies & percentages & chi square test was used as test of significance. The quantitative variables were presented as measures of central tendency and dispersion. A p value of less than 0.05 was considered as statistically significant. **Results** Initial fungal etiology was the main risk factor for the recurrence of microbial keratitis after TPK in (24%) of the cases followed by persistent epithelial defects (16%), Initial bacterial etiology (12%), Lid abnormalities (8%), contact lens use (8%), Secondary ocular hypertension (8%), prior rejection episodes (8%), initial viral etiology (4%), peripheral ulcerative keratitis (8%) & suture related problems (4%). **Conclusion:-** This study has shown that Fungal keratitis was the main reason for the initial TPK & initial Fungal aetiology was the main risk factor for the reinfection after TPK.

Introduction

The corneal opacity is often considered as an important cause of ocular morbidity around the world and India. The available estimates shows that the corneal opacity amounts to 0.10% in both the eyes and 0.56% in one eye. The burden of keratitis in childhood is 36.7%, during adulthood is 17.7% and it has been estimated that more than 90% of the corneal blindness is avoidable. 1 Microbial keratitis is an important common vision threatening disease prevalent all across the globe.. Many bacteria, fungi, viruses and acanthamoeba can result in this type of keratitis. 4

Trauma of cornea is incriminated as main predisposing factor for the microbial infiltration and definitive diagnosis and proper management is required to prevent the further progress. 7, 8 9 Therapeutic penetrating keratoplasty performed for non healing microbial keratitis helps in saving many eyes and functioning of the person.

Therapeutic penetrating keratoplasty has shown to result in upto 100% cure rate for bacterial and fungal keratitis but recurrence of infection after Acanthamoeba is quite frequent. 10

Penetrating keratoplasty is most frequently performed procedure across the world. The 10 years graft survival of PKP ranges from 89% for keratoconus to 36% lowest for the regrafts as estimated by Australian Corneal Graft Registry (ACGR). 11, 12 The failure & recurrence of the infection is a major concern for decades. . Suture related problems, persistent epithelial defects & failed grafts are the predisposing factors for the corneal graft failure. 13, 14

The recurrence rate ranges from 5 to 14% 15. The studies of recurrent infections after penetrating keratoplasty are scant around the world and India. Thus this study was undertaken to study the incidence, risk factors, type of infection and complications of the recurrent infections after penetrating keratoplasty.

Material & Method:- This study was conducted at the Upgraded department of Ophthalmology, SVBPH, Meerut from July 2019 to June 2020 and the patients were followed up for six months of period. This institution performs 120

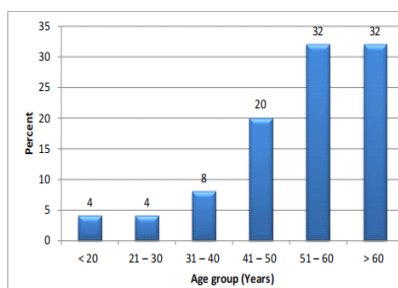
keratoplasty procedures per year on an average. This study was conducted for a period of one year and 25 patients had reinfection.

RESULTS

Discussion

The corneal opacity results in ocular morbidity. The literature available shows that paediatric age group is more vulnerable for the corneal opacity than the adult age group & more than 90% of the opacity occurs in developing countries. 1. The corneal blindness can devastate the life of person as he remains a liability for the family and community for the rest of their life. 2, 3 Therapeutic keratoplasty has a definitive role in management of progressive bacterial, fungal, acanthamoeba & viral keratitis which is refractory to medical line of management. Therapeutic keratoplasty has shown to result in upto 100% cure rate for bacterial and fungal keratitis but recurrence of infection after Acanthamoeba keratitis is quite frequent. 10 This is a hospital based prospective study of the factors causing the recurrence of infection in corneal grafts of the patients after TPK surgery.

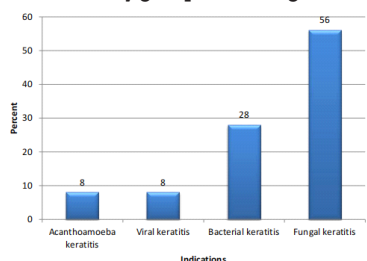
AGE GROUP



The age distribution of the study group had shown that about 32% of the patients with microbial keratitis after TPK were aged between 51 – 50 years and another 32% were aged more than 60 years. It was followed by 41-50 years (20%) & 31-40 years (8%).

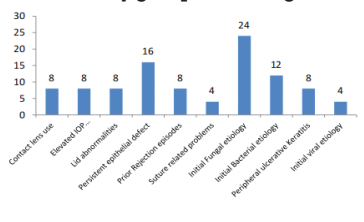
Fungal keratitis was the indication for TPK in 56% of the cases followed bacterial keratitis in 28% of the cases & Acanthamoeba keratitis & viral keratitis in 8% of the cases.

Distribution of the study group according to Indications



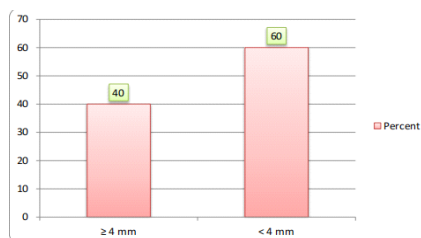
Risk factors

Distribution of the study group according to risk factors



Initial fungal etiology was the main risk factor for the recurrence of microbial keratitis after TPK in 24% of the cases followed by persistent epithelial defects (16%), Initial bacterial etiology (12%), Lid abnormalities (8%), contact lens use (8%), Secondary ocular hypertension (8%), prior rejection episodes (8%), initial viral etiology (4%), PUK (8%) & suture related problems (4%). In a study by Krysik et al, reinfection was found in 68.2% of the cases with complications.⁵⁰ In a study by Ximenes et al about 12.73% of the patients had recurrent fungal keratitis.⁵² A study by Chen et al noted that, suture related problem was the main risk factor in 31% of the cases followed by lid abnormalities in 23.8% of the cases and persistent epithelial defect in 23.8% of the cases.⁵⁴ Other have cited suture related problems as major risk factor which may account for more than 30% unlike the results of this study

Size of ulcer



The size of the ulcer was ≥ 4 mm in 40% of the cases and < 4 mm in 60% of the cases. Majority of the patients in a study by Chen et al had ulcer size of less than 4 mm which is similar to the results of this study.⁵⁴

CONCLUSION

This study was mainly undertaken to study the reinfection among cases who had undergone TPK. This study has shown that reinfection was present mostly in individuals with more than 50 years of age males outnumbered females. Fungal keratitis was the main reason for the initial TPK and initial fungal aetiology was the main risk factor for the reinfection after TPK. The ulcer size was less than 4mm in majority of cases. But this study is not without limitations. The sample size in the study was not calculated and sampling method was not followed. This was a single centre study. Hence, a study with elegant methodology can bring out more facts about the reinfections after TPK. Further research is also needed since the studies are scant.

REFERENCES

1. R Dandona, L Dandona "corneal blindness in a Southern Indian population - need for health Promotion strategies" Br J Ophthalmol 2000; 87: 133-141.

2. Gupta N, Tandon R, Gupta SK, Sreenivas V, Vashist P. Burden of corneal blindness in India. Indian J Community Med. 2013;38(4):198-206.

3. Oliva MS, Schottman T, Gulati Turning the tide of corneal blindness, Indian J Ophthalmol. 2012;Spe - Oct: 60: 5: 423-427.

4. Alkatan HM, Al-Essa RS. Challenges in the diagnosis of microbial keratitis: A detailed review with update and general guidelines. Saudi J Ophthalmol. 2019;33(3):268-276.

5. Upadhyay M.P., Karmacharya P.C., Koirala S. The Bhaktapur eye study: ocular trauma and antibiotic prophylaxis for the prevention of corneal ulceration in Nepal. Br J Ophthalmol. 2001;85:388-392.

6. Karsten E., Watson S.L., Foster L.J. Diversity of microbial species implicated in Keratitis: A Review. Open Ophthalmol J. 2012;6:110-124.

7. Hall BJ, Jones L. Contact lens cases: the missing link in contact lens safety Eye Contact Lens 2010; 36:101-105.

8. Shukla PK, Kumar M, Keshava GB. Mycotic Keratitis: an overview of diagnosis and therapy. Mycoses 2008; 51:183-199.

9. Buxton JN, Fox ML. Conjunctival flaps in the treatment of refractory pseudomonas corneal abscess. Ann Ophthalmol 1986; 18:315-18.

10. Sony P, Sharma N, Vajpayee RB, Ray M. Therapeutic keratoplasty for infectious keratitis: a review of the literature. CLAO J. 2002 Jul; 28(3):111-8.

11. Kelly TL, Williams KA, Coster DJ, "Australian corneal graft registry corneal transplantation for keratoconus: a registry study," Archives of Ophthalmology, 2011; 129:6:691-697.

12. Anshu A, Lim LS, Htoon HM, Tan DT, "Postoperative risk factors influencing corneal graft survival in the Singapore Corneal Transplant Study," American Journal of Ophthalmology, 2011; 151:3:442-448.

13. Hood CT, Lee BJ, Jeng BH. Incidence, occurrence rate, and characteristics of suture-related corneal infections after penetrating keratoplasty. Cornea 2011; 30:624-628.

14. Das S, Constantinou M, Ong T, Taylor HR. Microbial keratitis following corneal transplantation. Clin Exp Ophthalmol 2007; 35:427-431.

15. Mundra J, Dhakal R, Mohamed A, Jha G, Joseph J, Chaurasia S, et al. Outcomes of therapeutic penetrating keratoplasty in 198 eyes with fungal keratitis. Indian J Ophthalmol 2019; 67:1599-605.

16. Sun J, Chen W, Huang J et al, Microbial Keratitis after penetrating keratoplasty, Am J Ophthalmol, 2017; Jun: 178: 150 - 156.

17. Edwardo C A .Robert H R J .clinical diagnosis and management of fungal keratitis. Krachmer J H Mannis M J Holland E J Vol 2: cornea and external disease. Mosby, 1997, 1253-1267.

18. Anthony JB, Ramesh CH, Brenda JT, The cornea 7.1 Wolff's anatomy of the eye and orbit. VIIIth edition Chapman and Hall medical pg 233 - 268.

19. Kenyon KR Cheuver HY Morphology and pathologic response of corneal and conjunctival disease. Smolin G Thoft R A. The cornea IIIrd edition 1994: pg 69-115.

20. Xie L X , Zhai H L , Shadong Eye Hospital , China, on "Penetrating Keratoplasty for Treatment fungal keratitis with corneal perforation". zhonghua Yan Ke Za Zhi 2005, Nov; 4 (11):1009.

21. Al-Mujaini A, Al-Kharusi N, Thakral A, Wali UK. Bacterial keratitis: perspective on epidemiology, clinico-pathogenesis, diagnosis and treatment. Sultan Qaboos Univ Med J. 2009;9(2):184-195.

22. Tuli S, Gray M. Surgical management of corneal infections. Curr Opin Ophthalmol. 2016;27(4):340-347.

23. Thomas PA, Kaliyamurthy J, Mycotic keratitis: epidemiology, diagnosis and management, Clinical Microbiology and Infection, 2013; 19:3:210-220.

24. Ansari Z, Miller D, Galor A. Current Thoughts in Fungal Keratitis: Diagnosis and Treatment. Curr Fungal Infect Rep. 2013;7(3):209-218.

25. Stamate AC, T taru CP, Zemba M. Update on surgical management of corneal ulceration and perforation. Rom J Ophthalmol. 2019;63(2):166-173.

26. Deshmukh R, Stevenson LJ, Vajpayee R. Management of corneal perforations: An update. Indian J Ophthalmol 2020; 68:7-14.

27. Lorenzo-Morales J, Khan NA, Walochnik J. An update on Acanthamoeba keratitis: diagnosis, pathogenesis and treatment. Parasite. 2015;22:10.

28. Dart JK, Saw VPJ, Kilvington S, Acanthamoeba Keratitis: Diagnosis and treatment update 2009, Am J Ophthalmol: 148:4:487 - 499.

29. Suresh P S, Tullo A B. Herpes simplex keratitis. Indian J Ophthalmol 1999;47:155-65.

30. Raj A, Bahadur H, Dhasmana R. Outcome of therapeutic penetrating keratoplasty in advanced infectious keratitis. J Curr Ophthalmol. 2018;30(4):315-320.

31. Bajracharya L, Gurung R. Outcome of therapeutic penetrating keratoplasty in a tertiary eye care center in Nepal. Clin Ophthalmol. 2015;9:2299-2304.

32. Farooq AV, Shukla D. Herpes simplex epithelial and stromal keratitis: an epidemiologic update. Surv Ophthalmol. 2012;57(5):448-462.

33. Yagci A. Update on peripheral ulcerative keratitis. Clin Ophthalmol. 2012; 6:747-754.

34. Yao YF, Zhang YM, Zhou P, Zhang B, Qiu WY, Tseng SC. Therapeutic penetrating keratoplasty in severe fungal keratitis using cryopreserved donor corneas. Br J Ophthalmol. 2003;87(5):543-547.