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RESEARCH ARTICLE

PENETRATING KERATOPLASTY IN XERODERMA PIGMENTOSA

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ABSTRACT

Purpose: Visual restoration bypenetrating keratoplasty in a visually disabled case of xeroderma pigmentosa.
Case: A teenaged girl with XP having diffuse corneal opacity due to the disease process was operated by keratoplasty regained satisfactory workable vision to make her independent to move around despite high risk factors for failure. The associated cutaneous ailments and malignancies were also managed effectively.
Conclusion: The patients of XP suffering from corneal morbidities can be given some relief by performing PKP although the improvement may not be permanent.

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INTRODUCTION

Xeroderma pigmentosa (XP) is a rare autosomal recessive genetic disorder caused by defective DNA repair on exposure to low wavelength UV radiations with ocular, cutaneous and neurological problems. pigmentosa start in early childhood and is characterised clinically by cutaneous photosensitivity, pigmentary changes, photophobia, and propensity for early development of malignancy in sun exposed mucocutaneous and ocular structures. (Kraemer *et al*., 1987; Robbins *et al*., 1974) The skin of eyelids like other part of the face shows pigmentation, atrophy, loss of lashes, ectropion and loss of lids due to malignant growth erosion. Lids are involved in 80–100 % of the cases. Interpalpabral fissures being the sun exposed part of the conjunctiva shows telangiectasia, xerosis, chronic congestion and pigmentation in 18 % of cases. Corneal dryness exposure keratitis, hazyness, band-like nodular keratopathy, scarring, ulceration and even perforation resulting in corneal opacities and vascularisation are seen in 17–40 % of the cases. (Goyal *et al*., 1994; Kraemer *et al*., 1987; Robbins, 1988)

Case

A 16 years old girl was referred from skin department with history of diminution of vision in right eye for 9 years associated with redness, photophobia and foreign body sensation. She lost herleft eyefollowing trauma with stone at the age of 4 yrs. There was history of(h/o) multiple black coloured lesions on her hand and feet since the age of 4 years, which later involved her face, trunk and rest of the body, mostly on photoexposed parts. There is also h/o photosensitivity associated with these lesions. There was no h/o menstrual irregularities or consanguinity in the family. Cutaneous examination showed multiple brownish black coloured papules and plaques varying in size from 1 to 6cm on her hands, feet, face, trunk and rest of the body over the background of diffuse mottled pigmentation. (Figure-1) There were multiple ulcero- nodular lesions (0.5 to 2cm) with whitish brown crusting involving right cheek and dorsum of nose and left cheek. Her ocular examination revealed visual acuity of finger counting close to face and perception of light absent in left eye. There were pigmented papules and plaques on both eye lids and nasal pinguicula with pigmentation of limbal area from 1 to 9 o'clock position. Most of the cornea had leucomatous opacity along with periphreal pigmentation. There was linear pigmentation line extending horizontally from 3 to 9' o' clock across the cornea and vertically from centre to 6 'o' clock. The deep corneal vascularisation was present from 4 to 5 o' clock. (Figure-2) The details of rest of intraocular structures could not be assessed in right eye.Her left eye was phthisical. B scan of the patient showed normal posterior segment.

As the patient was single eyed and had profound visual impairment, so she was planned for optical penetrating keratoplasty. Intraoperatively the corneal graft bed had deep vascularisation in lower nasal quadrant and there was no

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distortion of anterior segment. Postoperatively the graft was clear and graft host junction well apposed. (Figure-3) She was put on topical steroids, antibiotic combinations along with lubricating eye drops. Graft clarity decreased by 3 weeks as the unhealthy host epithelium

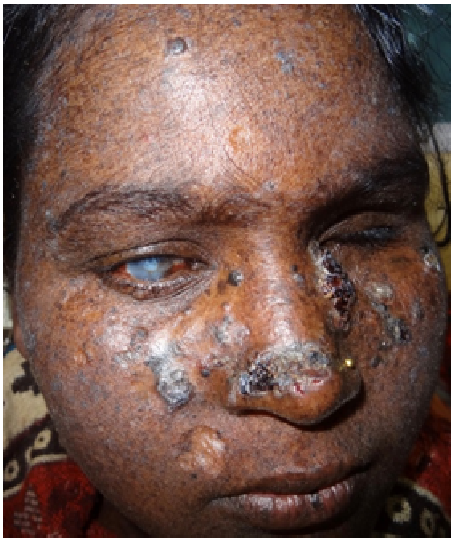

Figure 1. Photograph showing 16 year

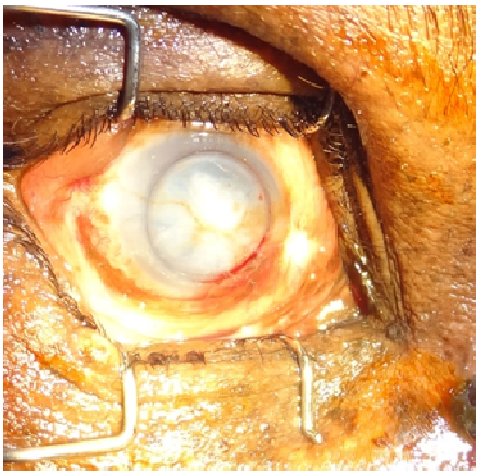

Figure 2. Leucomatous vascularised corneal old girl with xeroderma pigmentosumopacity with periphreal pigmentation with corneal opacity right eye

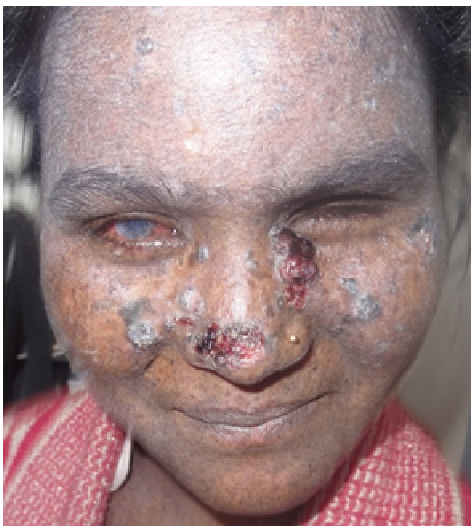

Figure 3. Early postoperative period with clear corneal graft

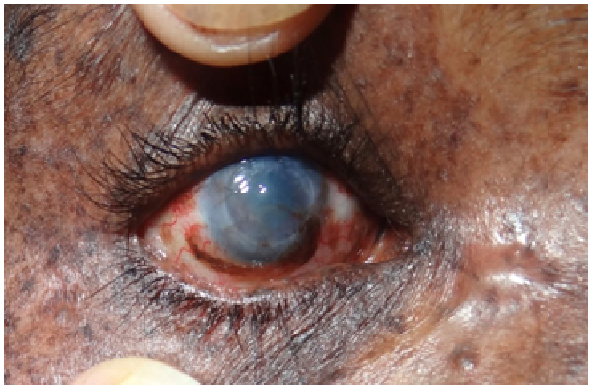

Figure 4. Pigmentation lines on graft

Covered the graft but it stabilised by 6 weeks. At 3 month follow up a pigmented line had appeared on the cornea extending from 3 'o' clock in the periphery to paracentrazone showing migration of diseased epithelial in specific growth pattern from limbus centre of graft tissue (Figure-4) Vision in right eye was 3/60 and she could movearound independently. Her AC was normal and IOP was normal digitally. All cutaneous ulcerative lesion were biopsied and two had squamous cell carcinoma, which were excised locally by plastic surgeon, as there were no regional metastasis. So patient has to managed for months in the hospital by different specialities.

DISCUSSION

Xeroderma Pigmentosa manifests as photosensitivity, hyper-pigmentation, premature skin aging and malignancies like skin carcinomas, sarcoma, melanoma as well as internal malignancies. (Rao *et al*., 2009; Mohanty, 2001) XP has a prevalence rate of 1:250 000. (Kraemer *et al*., 1987; Robbins *et al*., 1974) Nucleotide excision repair (NER) is an evolutionarily-conserved mechanism for repairing UV-induced photoproducts and other bulky DNA lesions. (Nouspikel, 2009) The importance of NER in cancer resistance is best illustrated by considering the natural history of patients with Xeroderma Pigmentosum (XP), a rare UV hypersensitivity syndrome caused by homozygous defects in any one of at least eight required effector proteins of a common pathway that executes NER:XPA, ERCC1, ERCC3 (XP-B), XPC, ERCC2 (XP-D), DDB2 (XP-E), ERCC4 (XP-F), ERCC5 (XP-G) and POLH. This pathway functions by recruiting a protein complex known as XPC-hHR23B to damaged DNA with XPE aiding in lesion verification. The transcription factor TFIIH containing multiple enzymes (XPA, XPB, XPD) unwinds DNA in the vicinity of the damaged bases and two endonucleases XPE and XPG incise the lesions on either side of damaged DNA. Finally using the undamaged strand as template DNA polymerase and DNA ligase synthesise new DNA.This case has most of the ocular manifestations of XP, the eyelid skin had pigmentation, atrophy, loss of lashes, and malignant growth erosion. Lids are involved in 80–100 % of the cases. Pathologically altered melanocytes due to mutations accumulate and form cutaneous freckles and hyperpigmented spots. The lesions in the lower eyelid were lesser compared to the upper lids as it forms a shade to the lower lid. Interpalpabral fissures being the sun exposed part of the conjunctiva shows xerosis telangiectasia and pigmentation in 18 % to 40% of cases. Corneal dryness, exposure keratitis, hazyness, band-like nodular keratopathy, scarring, ulceration and even perforation resulting in corneal opacities and vascularisation are seen in 17–40 % of the cases.

Table 1. Cases of xeroderma pigmentosa undergone penetrating keratoplasty reported in literatures

Author	Age at surgery	Diagnosis	Preop va	Post op va	Com plication	regraft	Final FU
Freed man*	16 yrs	opacity	PL+	20/30	Rejection-graft failure	3 months	6m
	13 yrs	opacity	PL+	20/80	Rejection-graft failure	3 months	6m
A Narang **	7yrs	opacity	HM	0.8 at 33cm on crowded logMAR	Cataract, amblyopia		71m
	8yrs	Opacity	HM	0.8 at 70cm on crowded logMAR	Cataract, amblyopia		61m

(Goyal *et al*., 1994; Kraemer *et al*., 1987; Robbins, 1988) The earliest ocular symptom of XP is photophobia which has been reported in 21% to 50%. The cause of photophobia is unknown. Corneal opacification and neovascularisation are suggested to be due to the accumulation of the pyrimidine dimers seen due to UV exposure. So corneal transplants are rarely indicated as corneal vascularisation, xerosis and inadequate lid coverage are seen in many of them. (Applegate and Ley, 1991) Pterygium formation is seen in most of the cases in both the eyes. Iris is spared as the corneal opacification shields it from UV damage but late changes like inferior half stromal atrophy, pigment alteration, iritis and iris melanoma are reported. The retina with its macular area rarely show any changes as the crystalline lens prevents any UV passing through. (Robbins *et al*., 1974; Goyal *et al*., 1994; Kraemer *et al*., 1987) Squamous cell CA (SCC) is the most frequent ocular surface neoplasm followed by basal cell CA and melanoma, commonly seen in the limbal area. These epibulbar neoplasms are reported in 11–20% of the cases with variable extension to the cornea and conjunctiva. This case did not have any ocular neoplasm but multifocal SCC at two different sites on face, which were excised completely.

Blindness is usually caused by corneal opacities, pterygium, tumour invasion from the limbus and corneal vascularisation. Visual acuity is less than 6/36 in 12–50 % of the cases. (Goyal *et al*., 1994) Management of these cases include early detection and prophylaxis from UV radiation, which has resulted in reduction of malignant tumors and improvement of survival. Protection from UV radiation by sunglasses and UV absorbing soft contact lenses are helpful. Artificial tears, steroid drops, bland ointment at night are used. Eye drops containing quinoline derivatives reduce photophobia and ocular irritation. Oral retinoic acid is also helpful in preventing corneal damage. The outcomes of penetrating keratoplasty are usually poor in view of corneal vascularisation, tumor invasion from the limbus and improper healing. Only few studies report successful PKP in XP but authors have recommended this procedure in careful selected patients. (Narang *et al*., 2013; Freedman, 1979) (Table) The visual improvement in this case was satisfactory as patient could move around independently. The graft was reasonably clear despite pigmentation, although associated amblyopia could have contributed for her poor vision.

Conclusion

The patients of XP suffering from corneal morbidities can be given some relief by performing PKP although the improvement may not be permanent as graft epithelium is replaced by defective host cells that may subsequently become hazydue to the underlying pathological process. These patient require multi speciality management for long timeand probably life long follow up.

REFERENCES

Applegate LA, Ley RD 1991. DNA damages involved in the induction of opacification and neovascularisation of the cornea by ultravioletlight. *Exp Eye Res*., 52:493–497

Freedman J. 1979. Corneal transplantation with associated histopathologic description in xeroderma pigmentosum occurring in a black family. *Ann Ophthalmol*., 11:445–448.

Goyal JL, Rao VA, Srinivasan R, Agrawal K 1994, Apr. Oculocutaneous manifestations of XP. *Br J Ophthalmol.,* 78(4):295–297

Kraemer KH, Lee MM, Scotto J. 1987 Xeroderma pigmentosum cutaneous, ocular and neurologic abnormalities in 830 published cases. *Arch Dermatol.,* 123:241–250

Mohanty P 2001. Mohanty l, Devi BP, Multiple cutaneous malignancies in xeroderma pigmentosum. *Indian J Dermatol Venereol Leprol*, 67:96–97

Narang A, Reddy JC, Idrees Z, Injarie AM, Nischal KK. 2013. Long-term outcome of bilateral penetrating keratoplasty in a child with xeroderma pigmentosum: case report and literature review. Eye, 27(6):775-776. doi:10.1038/eye. 2013.43.

Nouspikel, T. 2009. DNA repair in mammalian cells: Nucleotide excision repair: Variations on versatility. *Cell. Mol. Life Sci*., 66, 994–1009.

Rao TN, Bhagyalaxmi A, Ahmed K *et al*. 2009. A case ofmelanoma in xeroderma pigmentosum. *Indian J Pathol Microbiol*., 52:524–526

Robbins JH, Kraemer KH, Lutzner MA, Festoff BW, Coon HG. 1974. Xeroderma pigmentosum. *Ann Intern Med*., 80:221-48.

Robbins JH. 1988. Xeroderma pigmentosum: defective DNA repair causes skin cancer and neurodegeneration. *JAMA,* 260:384–388

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