

# Multi-layer Amniotic Membrane Graft for Pterygium in a Patient with Xeroderma Pigmentosum

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**Background:** Xeroderma pigmentosum (XP) is a rare, autosomal recessive, premalignant condition of the skin, and is reported to be associated with ocular surface disorders such as conjunctival malignancy and pterygium. Herein, we report a case of successful management of pterygium with multi-layer amniotic membrane graft (AMG) in a young XP patient.

**Case:** An 11-year-old Japanese girl, who had been diagnosed as having XP, was referred to us for treatment of her bilateral pterygium. Surgical intervention was attempted for a temporal, presumably fast-growing pterygium in her left eye. Multi-layer amniotic membrane grafting was performed.

**Observations:** The surgery-induced pain and irritation disappeared within a day. The limbal conjunctival autograft survived on the AMG and re-epithelialization over the AMG was completed in 2 weeks. Best corrected visual acuity improved from 20/32 to 20/16 one month postoperatively. During the 1-year follow-up period, no recurrence was noted.

**Conclusions:** The present case exemplifies that AMG as an adjunct to primary pterygium resection is effective even in a young patient with XP. In addition, multi-layer AMG, which we first demonstrated in this report, seems to be useful for protecting bare sclera and extraocular muscles from mechanical injury. **Jpn J Ophthalmol 2001;45:496–498** © 2001 Japanese Ophthalmological Society

**Key Words:** Amniotic membrane, multi-layer graft, pterygium, xeroderma pigmentosum.

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## Introduction

Xeroderma pigmentosum (XP) is a rare, autosomal recessive, premalignant condition of the skin, and is characterized by a defect in repairing ultraviolet radiation-induced DNA damage.<sup>1</sup> XP is also reported to be associated with ocular surface disorders such as conjunctival, as well as limbal, malignancy and pterygium.<sup>2</sup> Amniotic membrane graft (AMG) has recently been validated for reconstructing several ocular surface disorders, including pterygium.<sup>3–5</sup> Herein, we report a case of successful management

of pterygium with multi-layer AMG in a young XP patient. To the best of our knowledge, this is the first demonstration of multi-layer AMG for pterygium surgery.

## Case Report

An 11-year-old mentally retarded Japanese girl diagnosed with XP at the age of 4 years was referred to us for treatment of her bilateral pterygium. Family history of XP was not found. Surgery was performed under general anesthesia for a fast-growing pterygium that was invading the cornea of the left eye from the infero-temporal quadrant (Figure 1A). Human amniotic membrane was processed and preserved as reported previously<sup>3</sup> in Kanazawa University Hospital. The preparation and clinical use of

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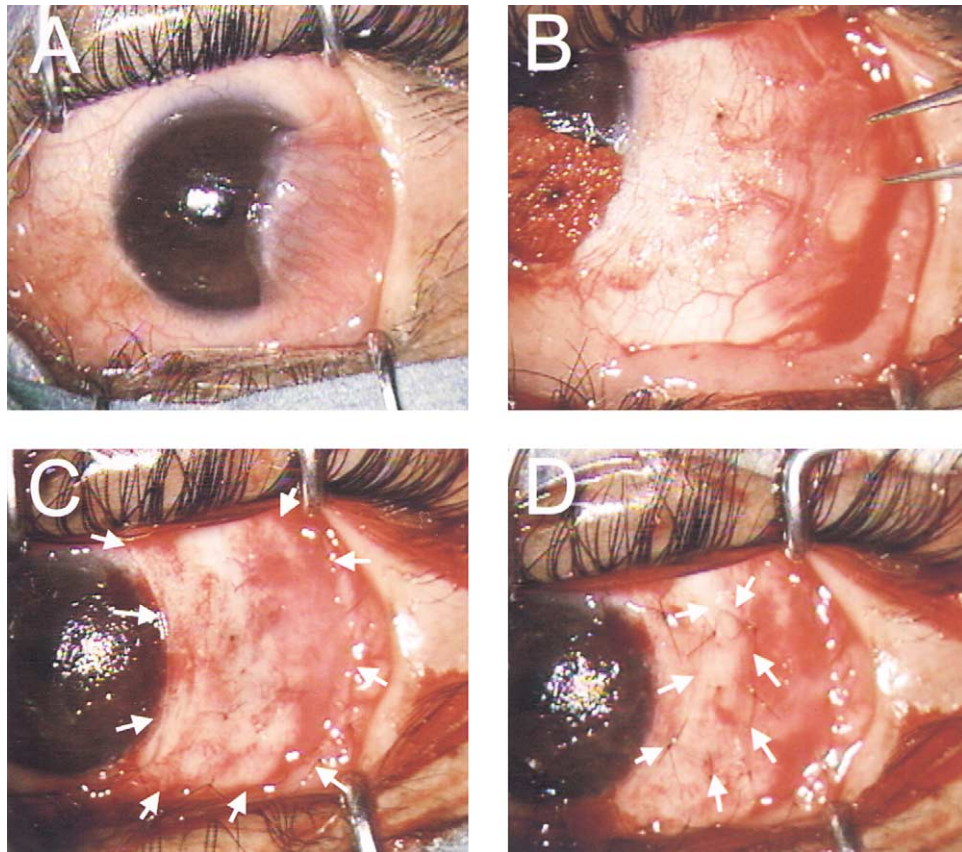
human amniotic membrane was approved by the ethics committee of the Kanazawa University School of Medicine. After extensive removal of the pterygium together with subconjunctival dense fibrovascular tissue (Figure 1B), a small ( $7 \times 7$  mm) piece of single-layer AMG was sutured with 7-0 Vicryl onto the sclera with the epithelial side down, to cover the exposed lateral rectus muscle. Another piece of AMG ( $10 \times 20$  mm) was folded with the stromal surfaces facing each other and the epithelial surface on the outside, and was anchored to the sclera with interrupted and running 10-0 nylon sutures to cover the entire conjunctival defect, including the first AMG (Figure 1C). A limbal conjunctival autograft ( $5 \times 5$  mm) harvested from the ipsilateral supranasal conjunctiva was sutured on the second AMG with 10-0 nylon followed by therapeutic soft contact lens insertion (Figure 1D). Postoperatively, eyedrops of

0.3% ofloxacin and 0.1% betamethasone were applied four times daily for 1 month.

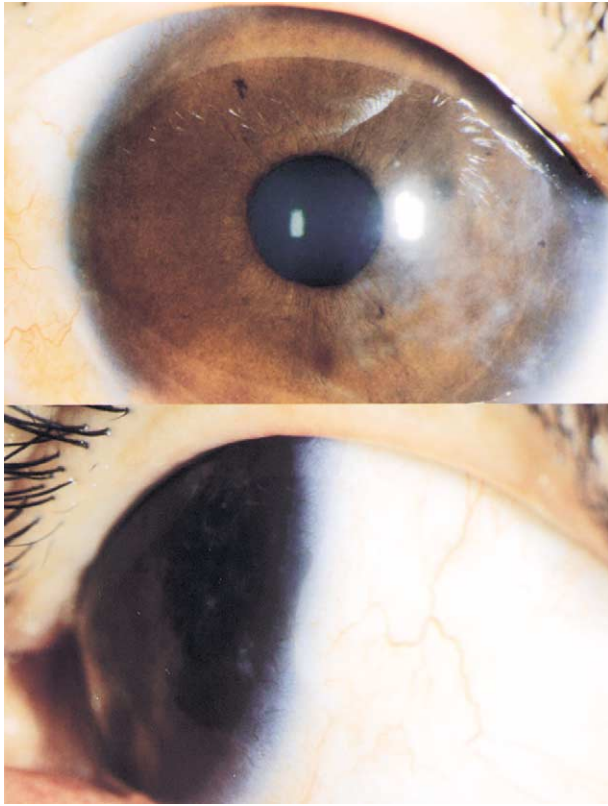
The surgery-induced pain and irritation disappeared within 1 day postoperatively. The limbal conjunctival autograft survived and re-epithelialization over the AMG was completed in 2 weeks. During the 1-year follow-up, neither recurrence nor any postoperative complication, such as graft rejection, symblepharon, or chronic inflammation, was observed (Figure 2, top, bottom). Corrected visual acuity improved from preoperative 20/32 to 20/16 one month postoperatively.

### Discussion

AMG has recently been used as an adjunct to pterygium surgery for preventing recurrence and for covering large conjunctival defects.<sup>3</sup> Ma et al<sup>5</sup> re-



**Figure 1.** Surgical procedures of multi-layer amniotic membrane graft (AMG). (A) Before surgery. Pterygium was invading cornea from infero-temporal quadrant. (B) Pterygium and dense subconjunctival fibrovascular tissue were removed extensively and lateral rectus muscle was exposed. (C) After placing small piece of single-layer AMG with the epithelial side down, a folded AMG with stromal surfaces facing each other was secured on sclera to cover entire conjunctival defect including first AMG. A total of three layers of AMG (multi-layer AMG) were used. Arrows show area of AMG. (D) Limbal conjunctival autograft (arrows) was harvested from supranasal bulbar conjunctiva and transplanted on surface of multi-layer AMG.



**Figure 2.** Anterior segment photographs taken 8 months after surgery. (Top) Corneal epithelium is healed without any complications. (Bottom) Inflammation was not observed over area of limbal conjunctival autograft and multi-layer amniotic membrane graft.

cently reported that AMG alone achieves a lower recurrence rate of 3.8%, as compared to 5.4% for conjunctival autograft in primary pterygium surgery. Although the recurrence rate of pterygium in an XP patient has not been reported yet, the pterygium in this case was regarded as highly aggressive considering the youth of the patient and that 40% of XP patients are reported to have bilateral pterygia.<sup>2</sup> Based on the data of Ma et al<sup>5</sup> and the fact that the pterygium in this patient was large, we performed AMG. In addition, we placed a multi-layer AMG in case the patient might rub her eye postoperatively, because she was young and mentally retarded. The first piece of AMG with the epithelial surface down was placed onto the exposed lateral rectus muscle for the purpose of preventing adhesion to the muscle by re-

generating subconjunctival tissue. The second piece of folded AMG with the epithelial surface outside was placed to cover the entire area devoid of conjunctival epithelia. This can make the AMG physically thick, which supposedly protects the rectus muscle and sclera from exposure by potential immediate melting of the AMG.

For rapid conjunctival epithelialization over the AMG, a small piece of limbal conjunctival autograft was placed on the AMG in this patient, according to the method of Shimazaki et al.<sup>4</sup> This limbal conjunctival autograft may not be required. However, Shimazaki et al<sup>4</sup> suggested that it may promote re-epithelialization, lessen inflammation, and help to restore the limbal function.

In conclusion, the present case suggests that an AMG with limbal autograft is effective for pterygium, even in a young XP patient where pterygium is supposedly highly active and easy to recur. Also, the multi-layer AMG, which we first demonstrated in this report, seems to be clinically useful compared to the single-layer method to avoid immediate melting induced by severe inflammation and to protect bare sclera and muscle especially when the patient's compliance is not good. Further comparative study between single and multi-layer AMG is needed to validate the clinical value of this mode of AMG.

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Dr. Tseng holds a patent on the preparation and clinical uses of human amniotic membrane. The other authors do not have any financial interest in amniotic membrane.

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