

Short Communication

Use of Mitomycin C in Ophthalmic Surgery

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Abstract

Mitomycin C is an alkylating agent with an anti-proliferative activity. Because of its potent anti-fibroblastic activity, it is used in multiple ophthalmic procedures where inhibition of proliferation of fibroblasts and vascular ingrowths is required.

INTRODUCTION

Mitomycin is an alkylating agent with anti-proliferative effect on cells showing the highest rate of mitosis by inhibiting its DNA synthesis. It is produced by *Streptomyces caespitosus*. The drug is also referred to as mitomycin C (MMC) to differentiate it from mitomycin A and B which under certain conditions are also produced by *Streptomyces caespitosus* [1]. MMC inhibits proliferation of fibroblasts, suppresses vascular ingrowths and is much more potent than 5-fluorouracil (5 FU) [2]. It is present in blue violate crystalline powder and is soluble in water. Following reconstruction of the powder for topical use, MMC is stable for two weeks when refrigerated at 2-8 degrees centigrade. Because of its anti-fibroblastic activity, MMC is used in various ophthalmic surgical procedures. The optimal dose of MMC is not known but is usually used in concentration of 0.1 mg/ml to 0.5 mg/ml in different setups.

Pterygium surgery

Pterygium is a fibrovascular growth which extends across the limbus onto the cornea. It is a common corneal disorder seen in countries with hot climate [3]. Once grown over cornea, apart from cosmetic blemish, it induces irregular astigmatism and once involves visual axis, it can severely curtails the vision. The treatment of choice for pterygium is surgical excision. However, the recurrence rate of pterygium after simple excision is quite high at 37%-91% [4,5].

Adjunctive use of MMC has shown significant decrease in its recurrence in various published series, prompting many workers to use it topically [6,7].

Pre-operative sub-ptyerygial injection of MMC also have shown good results in decreasing the recurrence [8,9].

Trabeculectomy

The common cause of trabeculectomy failure is fibrosis at conjunctival - scleral interface resulting in uncontrolled intraocular pressure IOP). MMC use maintains the drainage facility by inhibiting fibrosis over sclerotomy area with better

control of IOP. The first use of MMC in trabeculectomy is attributed to Chen [10], who claimed higher success in his cohort of 59 eyes undergoing trabeculectomy in refractory glaucomas. This has been followed with numerous reports in literature on the use of MMC in trabeculectomy in all types of glaucoma [11-14]. The concentration of MMC in glaucoma drainage surgery is between 0.1 mg/ml to 0.5 mg/ml with exposure time ranging between 1-5 minutes [15].

Refractive surgery

Over the years MMC has been used by refractive surgeons prophylactically to decrease the corneal haze after surface ablation procedures such as photorefractive keratectomy (PRK). The MMC inhibits activation of keratocytes and remodels myofibroblasts after laser surface ablation. One of the reasons for switching from PRK to laser in situ Keratomileusis (LASIK) was formation of corneal haze resulting in decrease corneal transparency and regression. Majumdar and co-workers [16], showed that use of MMC in concentration 0.2 mg/ml (0.02%) was good enough to prevent recurrent sub-epithelial corneal fibrosis. Similarly exposure time of 12 seconds against 1 minute and 2 minutes was equally effective addressing the issue of formation of haze. The standard approach starts with MMC 0.2 mg/ml (0.02%) applied for 20-30 seconds in primary cases of PRK and for longer exposure time of 1 minute in complicated cases like redo after LASIK or radial keratotmy (RK) [17-19].

CONCLUSION

Mitomycin C has proved to be an effective agent inhibiting cell proliferation with immunomodulation and is a potent adjunct in multiple ophthalmic surgical and laser procedures.

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