

# The use of Fentanyl Patches in the Management of Post-Operative Pain in Pterygium Surgery

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## ABSTRACT

**Introduction:** Pterygium are non-cancerous growths of the conjunctiva that often require surgical removal due to discomfort, cosmesis and distortion of vision. Although there are a number of techniques available, the consensus on best practice remains debated, with major goal of treatment to avoid recurrence. Pterygium can cause significant discomfort and often excision is indicated for symptomatic relief. While a number of studies have reviewed techniques to achieve best operative outcome and prevent recurrence, few have focused on post-operative pain which can be significant and impact on patient compliance.

**Methods:** Patients from the same ophthalmologist were prescribed a post-operative regime that included a 12-microgram fentanyl patch for 72 hours and were then surveyed to determine effect on pain control.

**Results:** The results of the study showed optimal pain control in approximately 90% of the 37 surveyed patients and post-operative nausea and vomiting reported in less than 20% of individuals.

**Conclusion:** In conclusion fentanyl patches are an effective analgesic agent for the management of post operative pain with minimal side effects reported. Further research is required to the utility of fentanyl in other ophthalmic procedures.

## Introduction

A horizontally-orientated fibrovascular growth on the cornea, pterygium is a degenerative condition of the conjunctiva [1]. These benign lesions are characterised by inflammation, increased angiogenesis and cellular proliferation [2]. While typically asymptomatic in the early stages, occasionally with minor irritation, over time the growth of the pterygium can induce astigmatism, impaired vision and diplopia. The prevalence is known to increase with age, the majority of cases belonging to 41-50year old (48.98%) [3]. The exact pathogenesis of pterygiums is still being investigated but believed to be multifactorial, with long term cumulative exposure to sunlight, in particular ultraviolet rays and chronic eye irritation from dry, dusty conditions a major aspect [4,5]. Recent studies by Wong et al and Solomon et al found evidence to support a transformed genetic pheno-

type of the cells may play a role [6,7]. Wong et al found decreased levels of insulin-like growth factor binding protein-3 (IGFBP3), strongly correlated with the presence of cancer, occurring in samples of pterygium compared to normal conjunctiva while Solomon et al found insulin-like growth factor binding protein-2 (IGFBP2) overexpression in the fibroblasts of pterygium samples [7]. There are a number of management options available with no consensus on best practice, however, surgical management remains the mainstay of treatment in large pterygiums with particular focus on post-operative management to prevent recurrence [8-10]. Various studies have evaluated multiple surgical techniques, from simple excision and transposition of head of pterygium to mucous membrane grafting, lamellar keratoplasty and limbal autografts [8,9]. Many have reviewed fixation methods and use of adjunct therapy in the management of pterygium in an attempt to improve post-operative recovery and recurrence [10].

However, few have reviewed management options to help with frequently reported post-operative discomfort. In 2018, Prat et al compared therapeutic contact lenses and tight bandage patching for pain management and found that therapeutic contact lenses resulted in more discomfort, pain and decreased quality of sleep within the first 24 hours post pterygium surgery but that inconvenience of the bandaging limited the use of this method [11]. Oksuz and Tamer found that lidocaine 2% gel produced a statistically significant reduction in pain scores post operatively but also in an increase in mean corneal re-epithelization time from 34.36+/- 10.00h in the control group to 37.56 +/-10.00h [12]. A small study of 80 participants found the use of topical cyclopentolate on post-operative pain post pterygium surgery has therapeutic potential, reducing pain scores significantly for the first 72 hours compared to the control group [13]. Although the aforementioned studies have shown possible changes in post-operative pain management of pterygium surgery, limitations exist and there is still no current gold standard. The aim of this study was to access the efficacy of fentanyl patches for the first 72 hours after surgery in the management of post-operative pain [14].

## Material and Methods

Patients from the same ophthalmologist were surveyed to determine the use of fentanyl post-operative pain control. Patients were prescribed a post-operative regime Mersyndol Forte two tablets six hourly as required for breakthrough pain or if allergic oral paracetamol 1000mg, six hourly and intravenous parecoxib intraoperatively with the addition of a 12-microgram fentanyl patch for 72 hours. Patients who had contraindications to the application of fentanyl such as allergy, significant cognitive impairment or respiratory conditions were given the post-operative regime of Mersyndol Forte two tablets six hourly as required for breakthrough pain or if allergic oral paracetamol 1000mg six hourly and intravenous parecoxib intraoperatively. The ophthalmic procedure was consistent for all surveyed patients. All surgeries were completed as day cases under local anaesthetic and sedation. The local consisted of subconjunctival infiltration only. The pterygium was excised with wide clearance and a superior conjunctival autograft fashioned to repair the defect. The graft was sutured into position using buried 8.0 vicryl sutures. Post-operative infiltration with sub-conjunctival Marcaine 0.5% was routine. A firm pad with chloramphenicol was applied and left intact until day one post operation review. The routine post-operative drop regime was hourly prednisolone forte during waking hours with 8 hourly chloramphenicol with reducing frequency of prednisolone forte as post-operative healing occurred.

Patients who underwent pterygium surgery at the North Queensland Day Surgery between September 2019 to September 2020 were surveyed. The survey questions looked at the patient's overall sleep quality, whether the patch was tolerated for the duration, pain control between good (no breakthrough and able to sleep all night), poor (some impact on sleep or breakthrough pain) and bad (significant impact) at night and in the morning with the fentanyl patch and presence of side effects common in opioid analgesia. Patients were reviewed day one post-operatively at the surgeon's private practice with overnight pain control and tolerance of opiate monitored with the anaesthetist formulating survey results on paper through a follow-up phone call, no online survey portals were used. Consent was implied with survey completion. The authors calculated proportions and percentages for all the quantitative results. Patients who scored good pain control at night and in the morning with good sleep quality post-operatively and no post-operative nausea and vomiting or other side effect such as respiratory distress and cognitive disturbances (hallucinations or confusion) was suggested to have adequate control.

## Results

During the survey period of September 2019 to September 2020, 70 patients were surveyed. Of the 47 patients surveyed, 37 patients completed the set of questions during the follow up phone call in the fentanyl group and 10 patients in the non-fentanyl group. Question 1 surveyed sleep quality with 30 of the 37 patients (81.1%) reported good sleep quality post operatively in the fentanyl group compared to 20% in the non-fentanyl group. 18.9% reported less than optimal sleep quality post-operatively in the fentanyl group compared to 80% in the non-fentanyl group. Question 2 and 3 suggested pain control was optimal in 34 of the 37 patients (91.89%), reporting nightly and morning post-operative pain scores with good control. Only 20% of patients reported good sleep quality in the non-fentanyl regime. 6 of 37 patients (16.2%) of patients reported post-operative nausea and vomiting with 57% of these patients suffering this side effect removing the patch early due to the complication. However, in total only 10.8% of the surveyed fentanyl subgroup patients removed the patch due to side effects or suboptimal pain control. Even without the addition of fentanyl 10% of patients reported nausea and vomiting. Other side effects reviewed including respiratory distress and cognitive impairment such as hallucinations, headache or confusion didn't occur in either subgroup (Table 1).

**Table 1:** Survey results.

Patient Outcome	Fentanyl	No Fentanyl
Sleep Quality post-operatively		
Good	30	2
Poor	5	3
Bad	2	5
Nightly pain score post-operatively		
Good	34	2
Poor	2	3
Bad	1	5
Morning pain score post-operatively		
Good	34	2
Poor	2	4
Bad	1	4
Post-operative nausea or vomiting		
YES	6	1
NO	31	9
Respiratory Distress		
YES	0	0
NO	37	10
Cognitive Impairment		
YES	0	0
NO	37	10
Patch Removed early		
YES	4	0
NO	33	0
N/A	0	10

## Discussion

Traditionally in Australia there are three intraoperative anaesthesia options used for pterygium surgery, either topical and/or subconjunctival, with both techniques providing good intraoperative analgesia without affecting ocular rotations therefore facilitating preparation of the conjunctival graft and patient cooperation during surgery or peribulbar [4,5]. Although all techniques provide excellent intraoperative analgesia, even the long-acting agents provide limited postoperative analgesia. Adjunctive measures to reduce postoperative pain have been studied including the use of tissue glue as a fixation method, patching or bandage contact lens, or topical therapeutic agents such as lidocaine gel, cyclopentolate and bupivacaine post-operatively [15-18]. The same surgeon, surgical technique, fixation method of primary sutures and post-operative care plan was used to

reduce influence of these confounding factors which studies have analysed can impact post-operative management [19-21]. The study has shown that 12-micrograms fentanyl patch could be an effective addition to pterygium post-operative management. The authors chose to exclude cases in whom bilateral surgery was performed due to possible impact on pain control. Although the sample size was small, the study was appropriately powered to appreciate a significant improvement in quality of sleep and pain control when compared to the control group with no fentanyl. It demonstrated that fentanyl patch as an analgesic agent at the conclusion of surgery improves patient comfort post-operatively in roughly 90% of patients.

## Conclusion

Pterygium surgery is one of the most commonly performed ocular surgeries and it would be optimal to have clear management guidelines. The ideal surgical technique for pterygium resection remains debated, surgical management remains the mainstay of treatment and the important factors taken into account should be recurrence rate, required surgical time and patient comfort[7]. Although various studies have evaluated the surgical technique and use of adjunct therapy, few have reviewed management options to help with frequently reported post-operative discomfort. This study highlights fentanyl patches as an effective analgesic agent to the management of post-operative pain after pterygium surgery and could be implemented in post-surgical care to improve patient comfort and compliance.

## Ethical Statement

Ethics approval for the survey was sort from the Townsville Hospital and Health Human Research Ethics Committee, Townsville, Australia.

## Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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## Consent

Written consent was obtained from the patient through hospital documentation for information to be included in the manuscript. Information has been de-identified to the best of the author's ability to protect privacy.

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