

Comparison of pain after injection of subconjunctival gentamicin or cefuroxime for cataract surgery

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Abstract

Aim: To assess any difference in pain between subconjunctival injection of gentamicin and cefuroxime for cataract surgery.

Patients and methods: This was a prospective single-blind clinical trial of 58 patients who underwent uneventful cataract surgery under regional or topical anesthesia. They were given a subconjunctival injection of either gentamicin or cefuroxime at the end of surgery. All patients completed questionnaires on the degree of pain immediately after the injection and 10 minutes after the injection. The data were analyzed using Fischer's exact test.

Results: Comparison of the pain scores between the gentamicin group and cefuroxime group resulted in no significant differences in pain immediately after the injection and 10 minutes after the injection. There were no significant differences to the type of anesthetic.

Conclusion: As there were no significant differences in pain following subconjunctival injection with gentamicin or cefuroxime, either antibiotic could be selected for endophthalmitis prophylaxis for cataract surgery.

Introduction

Endophthalmitis is a rare but serious complication of cataract surgery. Prevention of infection is the most important issue for this complication. Antibiotic prophylaxis has been shown to be effective for prevention. Several studies have shown that antibiotic prophylaxis can reduce the risk of postoperative endophthalmitis.^{1,2} Subconjunctival injection is one of method of administering antibiotic prophylaxis. Studies have shown that subconjunctival injection is beneficial and may be a factor in reducing the risk for endophthalmitis.^{3,4} Postoperative endophthalmitis is commonly caused by conjunctival flora, such as *Staphylococcus* sp. Since gentamicin and cefuroxime are effective against both gram-positive and gram-negative organisms, these agents are active against the common organisms that cause postoperative endophthalmitis. Both antibiotics are available in solution form and can be used for subconjunctival injection. However, subconjunctival injection of antibiotics could cause pain.⁵ The purpose of this study was to compare differences in pain after subconjunctival injection of gentamicin or cefuroxime, both at the time of injection and 10 minutes after injection, and to compare any differences associated with regional or topical anesthesia.

Patients and methods

Patients who were scheduled for extracapsular cataract extraction with intraocular lens implantation or phacoemulsification with intraocular lens implantation at the Department of Ophthalmology, Caritas Medical Centre from 12 January 2007 to 16 February 2007 were recruited into the study. The surgeries were performed using either regional anesthesia (2%

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lignocaine as a peribulbar block) or topical anesthesia (xylocaine gel). All extracapsular cataract extraction surgeries were done under regional anesthesia. Subconjunctival injection of antibiotic was given over the inferonasal region at the end of surgery; either 1 mL cefuroxime 75 mg/0.5 mL or 1 mL gentamicin 20 mg/0.5 mL was given according to the surgeons' preferences.

This was a prospective single-blind study, in that all patients were masked about which antibiotic they would receive. Verbal indication of injection of the antibiotic was given at the moment of injection. Patients were asked by an independent observer about the degree of pain at the time of injection and 10 minutes after the injection. The verbal rating scale (VRS) was adopted for this study as patients would be unable to use the visual analogue scale (VAS) due to the nature of the surgery; the VRS has been used to assess post-operative pain in previous studies.^{6,7} The degree of pain was objectively described as 'no pain', 'mild', 'moderate', 'severe', and 'excruciating'.

Statistical analysis

Data collected were analyzed by Fisher's exact test according to the antibiotic selection. The data were analyzed by dividing the information into 2 groups of 'no pain' and 'pain'. Further analysis was performed by subdividing the data into 2 groups of 'no or mild pain' and 'moderate or severe pain'. Statistical significance was taken to be $p < 0.05$.

Results

Fifty eight patients (58 eyes) were recruited into this study, 21 of whom were men and 37 of whom were women. All

patients were of Chinese ethnic origin. The mean age was 71.8 years (range, 38 to 94 years). Twenty three patients received gentamicin injection and 35 received cefuroxime injection. The pain analysis data are shown in Table 1. Surprisingly, no 'excruciating' pain was reported.

There was no significant difference in pain scores between patients in the gentamicin group and those in the cefuroxime group immediately after the injection or 10 minutes after the injection. There were no statistically significant differences between the 2 antibiotic groups for 'no or mild pain' versus 'moderate or severe pain' immediately after the injection or 10 minutes after the injection. Similarly, no differences were found between the 2 antibiotic groups when analyzed according to the type of anesthesia immediately after the injection and 10 minutes after the injection.

Discussion

Subconjunctival injection of antibiotic immediately after cataract surgery can reduce the risk of endophthalmitis.^{3,4} However, the administration of an antibiotic can be a painful step in cataract surgery.⁵ Gentamicin and cefuroxime are 2 commonly used antibiotics. Gentamicin is an aminoglycoside, which is effective against many gram-negative and some gram-positive organisms, while cefuroxime is a second-generation cephalosporin, which is active against most gram-positive as well as gram-negative organisms. This study was not performed to evaluate the efficacy of the 2 antibiotics, but to evaluate pain caused by injection of the drugs. Different patients have different pain thresholds. Some patients experienced no pain, while some felt pain of varying degrees. Since the administration of antibiotics could cause pain,

Table 1. Analysis of pain score for 58 patients receiving gentamicin or cefuroxime for cataract surgery.

	Immediately after injection		10 minutes after injection	
	Gentamicin Number of patients	Cefuroxime Number of patients	Gentamicin Number of patients	Cefuroxime Number of patients
Verbal rating scale				
No pain	14	10	15	9
Mild pain	14	10	14	9
Moderate pain	4	3	5	5
Severe pain	3	0	1	0
Excruciating pain	0	0	0	0
Group subdivision for analysis				
No pain	14	10	15	9
Pain	21	13	20	14
p Value	1.000		0.593	
Further subdivision for analysis				
No or mild pain	28	20	29	18
Moderate or severe pain	7	3	6	5
p Value	0.725		0.738	
Topical anesthetic group				
No pain	1	1	1	1
Pain	5	2	5	2
p Value	1.000		1.000	
Regional anesthetic group				
No pain	13	9	14	8
Pain	16	11	15	12
p Value	1.000		0.770	

it is preferable to consider the antibiotic that causes the least pain at injection, as well as providing a prophylactic effect.

There were some limitations to this study. Due to the small sample size, the results might not be generalizable to larger study populations. Secondly, different types of anesthetic were used during the surgeries. Therefore, the data were separated for analysis according to the type of anesthesia. Furthermore, extracapsular cataract extraction and phacoemulsification are different surgical techniques, with a larger corneal wound for extracapsular extraction. This difference might affect the pain experienced. To minimize this difference, pain was assessed at 2 different time points. The pain score given at the time of injection would mostly reflect the pain of injection, while the pain felt 10 minutes after the injection could reflect the overall impression of the surgery. Moreover, the selection of antibiotics was not randomized, but was given according to the surgeons' preferences. A

case series study instead of a randomized study could be considered.

Another possible limitation of this study is that the VRS was used instead of the VAS. As the non-operated eyes were covered by surgical towels during the operation and the vision of the operated eyes was not regained immediately after surgery, it was not feasible to use the VAS. The VRS seemed to be more suited to these patients, and may be regarded as a simplified version of the VAS. Previous studies have shown that the VRS may not be inferior to the VAS for assessing postoperative or acute pain.^{6,7} The pain score was divided into 5 levels ranging from no pain to excruciating pain.

The results of this study showed that there were no significant differences in pain between subconjunctival injection of gentamicin and cefuroxime. In addition, no patients reported excruciating pain. Therefore, either gentamicin or cefuroxime could be selected for endophthalmitis prophylaxis for cataract surgery.

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