

Cocaine flakes versus tetracaine/adrenaline solution for local anaesthesia in septoplasty*

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SUMMARY

The aim of this prospective study was to evaluate the efficacy of cocaine flakes compared to tetracaine with adrenaline solution, as a local anaesthetic for patients undergoing septoplasty. From January 2001 to December 2002, 220 patients underwent septoplasty under local anaesthesia. Patients were randomly classified in group A and group B, where cocaine and the solution of tetracaine/adrenaline were used respectively. A visual analogue scale was used to evaluate the severity of the patients' pain during the procedure. The patients of group B showed a statistically significant lower pain score than patients of group A. We believe that the solution of tetracaine/adrenaline is an effective and safe anaesthetic for patients undergoing septoplasty under local anaesthesia.

Key words: cocaine, tetracaine, pantocaine, local anaesthesia, septoplasty

INTRODUCTION

Local anaesthesia continues to be used in many cases of septal and nasal reconstruction surgery. Advantages of local anaesthesia are the freeing of operative room from the apparatus necessary for general anaesthesia, and a decreased bleeding, making tissues easier to handle (Hinderer, 1971).

Cocaine was first introduced as a local anaesthetic by Koller and Freud in ophthalmology (1884) and soon afterwards in rhinology. Despite its toxic side effects, many nasal surgeons prefer cocaine to the modern anaesthetics. The maximum of cocaine dose for intranasal application is considered to be 200-300 mg (4mg/kg). However, the routine use of cocaine has been criticized because of its increasing cost, abuse potential, side effects, and availability restrictions. Thus, alternative topical anaesthetics for intranasal procedures are desirable (Grinspoon and Bakalar, 1981; Fairbanks and Fairbanks, 1983; Chiu et al., 1986).

Tetracaine was a commonly used topical anaesthetic in the past. It is a very potent and effective local anaesthetic, especially in structures deeper than the superficial mucous membrane, providing long duration anaesthesia. The combination of tetracaine with adrenaline (ADR) could be a sufficient mixture for local anaesthesia and vasoconstriction (Covino, 1987; Noorily et al., 1995).

The purpose of this study was to compare the anaesthetic effect of cocaine flakes with that of tetracaine/ADR during nasal septal surgery.

MATERIAL AND METHODS

A prospective study was conducted between January 2001 to December 2002 in our department (Department of Otorhinolaryngology, University of Crete School of Medicine, Heraklion, Crete, Greece), on patients with nasal septum deformity who underwent septoplasty under local anaesthesia. Patients taking antidepressants, hypnotic or anxiolytic medication, were excluded from the study. All patients were operated by the two senior surgeons (J.G.B., D.E.K.) with the same technique. Patients were randomly classified in two groups; group A and group B where cocaine flakes, and the solution of tetracaine/ADR were used respectively.

Two nasal metal cotton-wool applicators (NMCWA) soaked with cocaine flakes were used in each nasal cavity for local anaesthesia in group A. The total cocaine dose was 200mg. In patients of group B three neurosurgical sponges (60mm x 8mm) soaked with the tetracaine/ADR solution (5ml) were used in each nasal cavity. The solution of tetracaine/ADR was prepared just before the operation by mixing 5ml of tetracaine 2% and 1ml of ADR 1:1000, and removing 1ml of the mixture. The total tetracaine dose was 83mg.

The first NMCWA or neurosurgical sponge was inserted beneath the roof of the nose anesthetizing the branches of the anterior ethmoid nerve, and the second NMCWA or sponge was passing across the midportion of the inferior turbinate to reach the posterior end of the middle turbinate in the region of the sphenopalatine foramen. In patients of group B a third sponge was applied on the surface of the mucosa of the nasal

septum (Figure 1). It should be underlined that the pledgets soaked with tetracaine/ADR solution were completely wrung out before their insertion to the nose.

The same premedication (50mg Pethidine Hydrochloride intramuscularly; and 5mg Diazepam, plus 100mg Phenobarbital, plus 25mg Hydroxyzine, plus 20mg Omeprazole orally) was given in all patients one hour before the operation. Pulse rate, blood pressure and blood oxygen saturation were monitored during the procedure in all of them. A 25 gauge needle was also used for infiltration of about 2ml xylocaine hydrochloride (2%) with adrenaline (1:100.000), on both sides of the caudal edge of the nasal septum. Duration of procedure and complications occurring during the operation were placed in a database. All patients were asked to evaluate the severity of pain during the operation, by completing a visual analogue scale the morning of the first postoperative day (range, 0-10, 0= no pain, 10= intolerable pain).

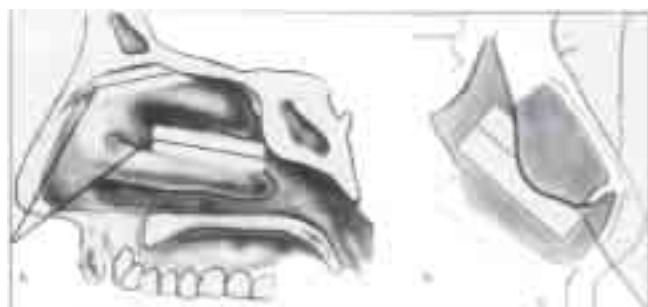


Figure 1. Three neurosurgical sponges soaked with the tetracaine/ADR solution are used in each nasal cavity for local anaesthesia. a. The 1st neurosurgical sponge is inserted beneath the roof of the nose. The 2nd sponge is passed across the midportion of the inferior turbinate to reach the posterior end of the middle turbinate in the region of the sphenopalatine foramen. b. The 3rd sponge is applied on the surface of the mucosa of the nasal septum.

RESULTS

Our series consisted of 220 persons, 54 female and 166 male, aged between 18 and 65 years old (mean age 36). Cocaine (200mg) flakes was used as a local anaesthetic in 110 patients and tetracaine/ADR solution in the other 110. Duration of the procedure did not differ between the two groups and varied from 40 to 70 minutes. The mean score on the visual analogue scale was 6.6 ± 2.2 ($X \pm SD$) in patients of group A (cocaine) and 4.7 ± 1.4 ($X \pm SD$) in patients of group B (tetracaine/ADR) respectively. The patients of group B (tetracaine/ADR) showed a statistically significant lower pain score (unpaired t-test $p < 0.001$) than the patients of group A (cocaine) (Figure 2).

In patients of group A (cocaine 200mg), central nervous or cardiovascular system side effects occurred in 19 patients (17.3%), probably as a result of local anaesthetic induced toxicity. In patients of group B (tetracaine/ADR) no such incidences occurred.

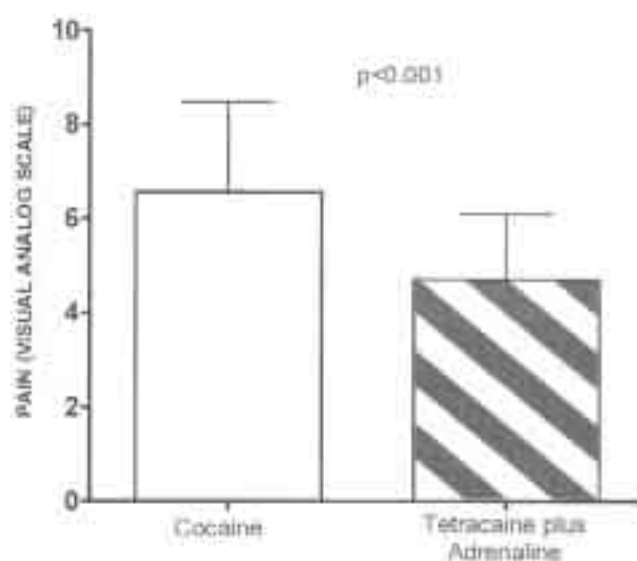


Figure 2. Results of the visual analogue scale (range, 0-10, 0 = no pain, 10 = intolerable pain). The mean score was 6.6 ± 2.2 ($X \pm SD$) in patients of group A (cocaine), and 4.7 ± 1.4 ($X \pm SD$) in patients of group B (tetracaine/ADR). Patients of group B showed a statistically significant lower pain score (unpaired t-test $p < 0.001$) than patients of group A.

DISCUSSION

Otolaryngologists and facial plastic surgeons rely on local anaesthetics to perform many intranasal procedures.

For many years, cocaine was the topical local anaesthetic agent of choice for intranasal procedures, but its increasing cost, decreasing availability, toxicity and habit-forming potential revealed the need for alternative local anaesthetics (Fairbanks and Fairbanks, 1983; Chiu et al., 1986).

Tetracaine is most commonly used for spinal anaesthesia, but is also suitable for infiltration, peripheral nerve block, and topical anaesthesia on accessible mucous membranes (Covino, 1987). Adriani and Campbell in 1956 reported fatalities occurring after the topical application of local anaesthetics to mucous membranes. Most of these cases involved tetracaine. Cambell and Adriani in 1958, and Astrom and Persson in 1961 demonstrated that tetracaine when applied to the mucous membranes of the pharynx and trachea is absorbed systemically in such amounts that its blood levels are comparable with those after intravenous injection. As a result of these reports, the use of tetracaine as a topical anaesthetic fell into disfavour and cocaine continued to be the recommended topical agent for nasal anaesthesia (Noorily et al., 1995).

In our department most of the cases with nasal septum deformity were operated under local anaesthesia with cocaine – flakes 200mg. Many patients referred some degree of pain. In some of them cocaine side effects appeared during the procedure, including cardiovascular toxicity such as hypertension and tachycardia, mild to moderate hypotension, peripheral vasodilatation and profound hypotension. In cases where a

longer duration of anaesthesia was needed, the patients felt uncomfortably with moderate or severe pain, asking to stop the procedure.

As a result of our previous experience and relying on the publications of Stammberger (1986) about the use of tetracaine in FESS, we decided to compare the anaesthetic effect of tetracaine 2%/ADR to that of cocaine flakes 200mg in nasal septum surgery.

The results of our study were impressive demonstrating the superiority of tetracaine 2%/ADR compared to cocaine as a local anaesthetic to nasal septum surgery and particularly in cases when longer duration of anaesthesia was desirable.

In patients of group B (tetracaine 2%/ADR) no central nervous or cardiovascular system side effects occurred as a result of local anaesthetic induced toxicity, whereas in patients of group A (cocaine) we had 19 such incidences. We believe the reasons for having no side effects from the tetracaine use were the dose of tetracaine, which did not exceed the maximum recommended dose of 100mg, as well as the added adrenaline.

Tetracaine can be easily prepared in the hospital's pharmacy, since there are no availability restrictions, as happens with cocaine. It should be noticed that there is an incompatibility between tetracaine and light, so it should be stored unopened, in a dark place in temperatures between 2-8°C (European Directorate for the quality of medicines).

Tetracaine has a longer latency period than other local anaesthetics. So the surgeon has to wait for a while, approximately 10 minutes, before starting the procedure (Covino, 1987).

It should be noticed that in our study we compared two anaesthetic agents delivered in different ways. We decided not to use the cocaine solution because we wanted to compare our traditional technique with cocaine flakes to a new one with the solution of tetracaine/ADR. This period in our department there is a new study in progress, comparing the tetracaine 2%/ADR to 5ml of cocaine 4% solution, applied the same way in the nasal cavity.

In conclusion, the solution of tetracaine/ADR is recommended for nasal septum surgery since it provides better anaesthesia than cocaine flakes, without side effects from the central nervous and cardiovascular system, if the maximum recommended dose of 100mg is not exceeded.

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