SUTURING OF THE FAUCIAL PILLARS AND ITS EFFECT ON THE PAIN FOLLOWING TONSILLECTOMY

By

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ABSTRACT

Pain following tonsillectomy is an important problem. It causes significant morbidity resulting in loss of work time and high level use of analgesics. It seems that only few patients receive effective post-operative analgesia despite the various surgical and pharmacological methods described.

The objective of this study was to determine whether suturing of the faucial pillars resulted in less post-operative pain than using the conventional method of tonsillectomy. The study also compares results with other similar studies, and analyses advantages and disadvantages of the proposed method.

In this prospective randomized study, 55 consecutive adult patients underwent tonsillectomy by blunt dissection under standardised technique of general anaesthesia. one tonsillar fossa was obliterated with Vicryl 4-0 sutures. The opposite tonsil fossa was treated as a control.

On admission, patients were supplied with a questionnaire in which they were asked to score the intensity of pharyngeal pain on each side, on an analogue scale of 0-10 degrees during fourteen post-operative days.

Information regarding a number of other parameters was also requested.

On the 14th day patients were assessed by an ENT surgeon , questionnaires collected and data analysed.

On the 1st and 2nd post-operative days mean pain score on the unsutured side was higher than on the sutured side. On the 3rd to 14th post-operative day, the mean pain score on the unsutured side was higher than on the sutured side. On most days the difference was statistically significant ($p < 0.002$).

Otalgia and odynophagia showed a similar pattern to the throat pain with greater number of patients experiencing otalgia and odynophagia on the sutured side on days 1st and 2nd. From the third day the situation reversed and greater number of patients experienced more pain of the unsutured side. On most days except on the 3rd day for otalgia this was statistically significant ($p < 0.0003353$).

Suturing of the pillars added on average 3 minutes and 37 seconds to the duration of the operation constituting approximately 25% of surgical time.

Obliteration of the tonsillar fossa with Vicryl sutures is associated with a significantly decreased morbidity from the 5th post-operative day.

It is not associated with any major complications however it prolongs operation time significantly and increases overall cost of the procedure.

DECLARATION

This work is an original study by the author and has not been submitted in any form to any other University. Wherever use of the work of others was made it has been indicated in the text. The research was carried out in the Department of Otorhinolaryngology, University of Natal, under the supervision of Doctor Brian Williams (M.Med. Otol.FCS).

SUPPORTING SERVICES

In the above study all the statistical planning and analysis as well as recommendations arising from these analyses, have been prepared in consultation with the Institute for Biostatistics of the Medical Research Council at the University of Natal.

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CHAPTER 1

INTRODUCTION

Tonsillectomy remains one of the most common surgical procedures in ENT . More than a thousand patients every year undergo tonsillectomy in the Ear Nose and Throat Department at the University of Natal.

This procedure is associated with significant post-operative pain which causes significant morbidity resulting in loss of work time and high level use of analgesics.

Few studies demonstrate any significant pain relief after tonsillectomy using various techniques. Several workers described various surgical and pharmacological methods to reduce post-operative pain. These include the use of bipolar diathermy versus ligation (Choy and Su, 1992), KTP Laser (Oas and Bartels 1990), pre-incisional infiltration of bupivacaine (Schoem et al, 1993), topical steroid injections (Liu and Su, 1996), and diclofenac (Dommerby and Rasmussen, 1984), acupuncture (Strom 1974), and the use of chewing gum (Schiff 1982) which may be impregnated with salicylic acid (ASPERGUM).

The results of these studies have generally been inconclusive and have not lead to any improvement of the standardized tonsillectomy technique, or to the management of post-tonsillectomy pain.

Presently most surgeons prescribe paracetamol, aspirin and other non-steroid anti-inflammatory agents, supplementing this with narcotics for the first night post-operatively and adjunctive mouth washes and encouraging patients to eat and chew as soon as possible.

Theoretically obliteration of the tonsillar fossa and closure of raw surfaces with exposed nerve endings which are constantly irritated by saliva and food should result in less post operative pain and morbidity. The aim of this prospective study is to assess whether this is, in fact, true and to compare this results with a number of similar trials.

CHAPTER 2

REVIEW OF LITERATURE

Pain following tonsillectomy remains an important problem and it causes significant post-operative morbidity. The relief of post-tonsillectomy pain has baffled ENT surgeons for many years and several workers have described various surgical and pharmacological methods to reduce this pain, however no studies demonstrate any improvement of pain control.

The exact cause of post-tonsillectomy pain is not clear, but it is felt that it is due to disruption of mucosa, exposure of glossopharyngeal nerve fibres (which are constantly irritated by saliva and food) resulting in spasm of the pharyngeal muscles (Demester, 1988). Granulation tissue gradually forms over the tonsillar fossa resulting in resolution of pain. It takes approximately 14 days for the patient to feel free of pain (Nandepalan, and McIlwain 1995).

It was noted by some ENT surgeons that when the faucial pillars were sutured in to secure cases of persistent oozing,this resulted in less post-operative pain than in the patients in whom the raw surfaces were left exposed (Y.S Weighill et al, 1986).

The following groups of investigators have recently studied the effect of suturing the faucial pillars on post-tonsillectomy pain, but their results are controversial.

(1) Weighill and Proops (1986) sutured faucial pillars on one side with catgut 3.0 and assessed pain on 3 consecutive post-operative days. They found that the sutured side was initially more painful, but the situation reversed by the third post-operative day. However the results did not prove to be statistically significant.

These authors used easily absorbable catgut sutures which did not obliterate the tonsillar fossa for an adequate length of time. The period of post-operative pain observation is also too short.

They also described several cases of post-operative haemorrhage which presented as a palatal haematoma.

They did not obliterate the tonsillar fossae adequately leaving some dead space and this was most likely responsible for the palatal haematoma formation.

Additionally surgeons performing tonsillectomy were of various surgical experience and this could have influenced the results.

(2) Nandapalan and McIlwain (1994) obliterated the tonsillar fossae without leaving any dead space with less absorbable 2.0 polydiaxone sutures and found that this procedure caused significant pain relief in the ten day post-operative period without causing any major complications (no case of palatal haematoma), or functional disability, Although initially patients experienced less pain on the unsutured side, later the situation reversed.

These authors used large suturing material which could cause more trauma to the tonsillar pillars and consequently more pain.

They followed patients for 10 post-operative days but a recent study by Murphy (1998) indicated that pain scores show progressive decrease until day 14 and longer.

(3) Finally Ramjettan and Singh (1996) sutured both tonsil fossae with catgut and found no difference in the pain/discomfort index during the first post-operative day in patients with sutured and unsutured pillars. They used two different groups of patients. The subjective and highly individualised tolerance to pain makes objective comparison between different patients difficult. The period of post operative assessment of pain is also too short.

CHAPTER 3

PATIENTS AND METHODS

Approval for this study was obtained from the Head of the Otorhinolaryngology Department and from the Ethics Committee of the Medical School, University of Natal. The purpose of this study, the method of surgery and potential complications were explained to the patients, and their written consent was obtained.

Patient eligibility

55 consecutive patients over the age of 13 years undergoing tonsillectomy for chronic tonsillitis, recurrent attacks of acute tonsillitis or previous peritonsillar abscess were included in this study.

Exclusion criteria

Because of the subjective pain assessment and the use of a questionnaire, patients younger than 13 years were excluded due to expected difficulties in co-operation.

All patients with a history of blood dyscrasia, allergies, serious medical conditions predisposing to intra and post-operative complications were excluded from this study, as were those having additional surgical procedures.

Anaesthesia

All patients underwent general anaesthesia. They were admitted the night before the operation and a benzodiazepine was given as premedication. Anaesthesia was induced with Thiopentone and maintained with a mixture of Oxygen, Nitrous Oxide and Isoflurane.

Vecuronium was used as a muscle relaxant.

Pethidine 1mg/kg was injected intramuscularly to supplement peri-operative analgesia.

Technique of Tonsillectomy

Following the induction of anaesthesia patients were placed in a supine position with the head extended.

A mouth gag was inserted and the tonsils were dissected by a blunt technique and removed using an Eve's snare.

Haemostasis was obtained by packing with dry swabs and by electrocautery (power setting of 30 Watts).

The side to be sutured was randomised by tossing a coin "Heads" were sutured on the left side and "Tails" were sutured on the right side.

A 4-0 Dexon suture on a round bodied needle was used.

The tonsillar fossa was obliterated with no dead space by passing the suture through the posterior pillar, the floor of the tonsillar bed and the anterior pillar, and the suture was knotted. Four sutures were inserted.

The time added by this procedure to the duration of each operation was recorded, as well as how many times electrocautery was used on the sutured and unsutured side.

Post Operative Management

On reversal every patient was given Ketoprofen 100mg per rectum. Analgesia was continued in the ward by using Paracetamol 1g 6 hourly p.o. and Ketoprofen 100mg 12 hourly for 24 hours, then Paracetamol 1g p.o. 6 hourly p.r.n for the following 2 weeks.

No post-operative antibiotics were used.

Post operatively the patients were kept in hospital for 24 hours.

On the 1st post operative day the patients were examined by the ENT surgeon on duty and asked which side of the pharynx hurts more, and to score the degree of pharyngeal pain on each side on a scale of 1-10.

The visual analogue scale consists of a 100 mm horizontal ungraduated line connecting two points marked as "no pain" and "very severe pain". The patients indicate how they feel by placing a mark across the line. (See figure below)

No pain very severe pain

The scale was scored by measuring the distance in centimetres of the mark from the zero point on the line.

The side which was obliterated was not known to the patient.

On discharge, all patients were given a questionnaire to be completed over the next two weeks. Other specific questions regarding otalgia, pain on swallowing, the number of Paracetamol tablets taken every day, bleeding episodes and time of return to normal duties were asked.

On the 14-th postoperative day patients were reviewed by an ENT clinic doctor who assessed the state of the tonsillar fossae, the presence of any complications and any functional disability caused by the procedure.

Finally the side that had been sutured was revealed to the patients and they were asked their opinion of the pain control, and whether they would recommend such a procedure to the others.

Statistical Analysis

Pain scores were calculated for each patient for 14 days.

Mean and standard deviations were calculated on each side for every day. The non- parametric Wilcoxon signed rank test was used to assess any significant difference in pain between the sutured and unsutured side. A statistical p value of < 0.05 was regarded as significant.

Totals of patients reporting pain on the sutured side being greater or lesser than on the unsutured side were calculated for 14 days.

A Binomial probability test was used to assess any significant difference in the numbers of patients. A p value of < 0.001 was regarded as statistically significant.

CHAPTER 4

RESULTS

52 patients (95%) completed the study. 3 patients were excluded. 2 were eliminated because of failure to complete the questionnaire and 1 because of a breach in the protocol for the general anaesthesia technique.

Age and sex

The mean age of 21 females and 31 males was 29 years (range 13-51 years). The tonsillar fossa was obliterated on the left side in 24 patients and on the right side in 28 patients.

Indications for Surgery

The main indication for tonsillectomy was a history of recurrent tonsillitis (24 patients), chronic tonsillitis (22 patients) and peritonsillar abscess (6 patients).

Pain Control

In the first post operative day the mean pain score for all patients was 8.53 on sutured and 8.07 on the unsutured side. This difference was statistically significant (as shown by Wilcoxon signed-rank test) $p = 0.0000$.

Figure I shows the mean pain scores on the sutured and unsutured side of 52 patients from the first to the fourteenth post operative day as well as the p values.

On days 1 and 2 the sutured side was more painful and on days 3 to 14 the unsutured side was more painful. The difference was statistically significant on day 1 and 2 and then from the 5th to the 14th day.

Initially over the first 2 days most patients (1st day 38 patients and 2nd day 35 patients) experienced more pain on the sutured side. Later the situation reversed. The difference was statistically significant for days 1 and 2 and then from 5^{th} to 14^{th} day ($p < 0.0001$) as analysed by Binomial probability test.

Figure 2 shows number the of patients experiencing greater, lesser or equal intensity of pain on the sutured side compared with the unsutured side.

A total number of 45 out of 52 experienced pain relief of the sutured side.

3 patients reported the pain being worse throughout on the sutured side.

4 patients did not notice any significant difference on either side.

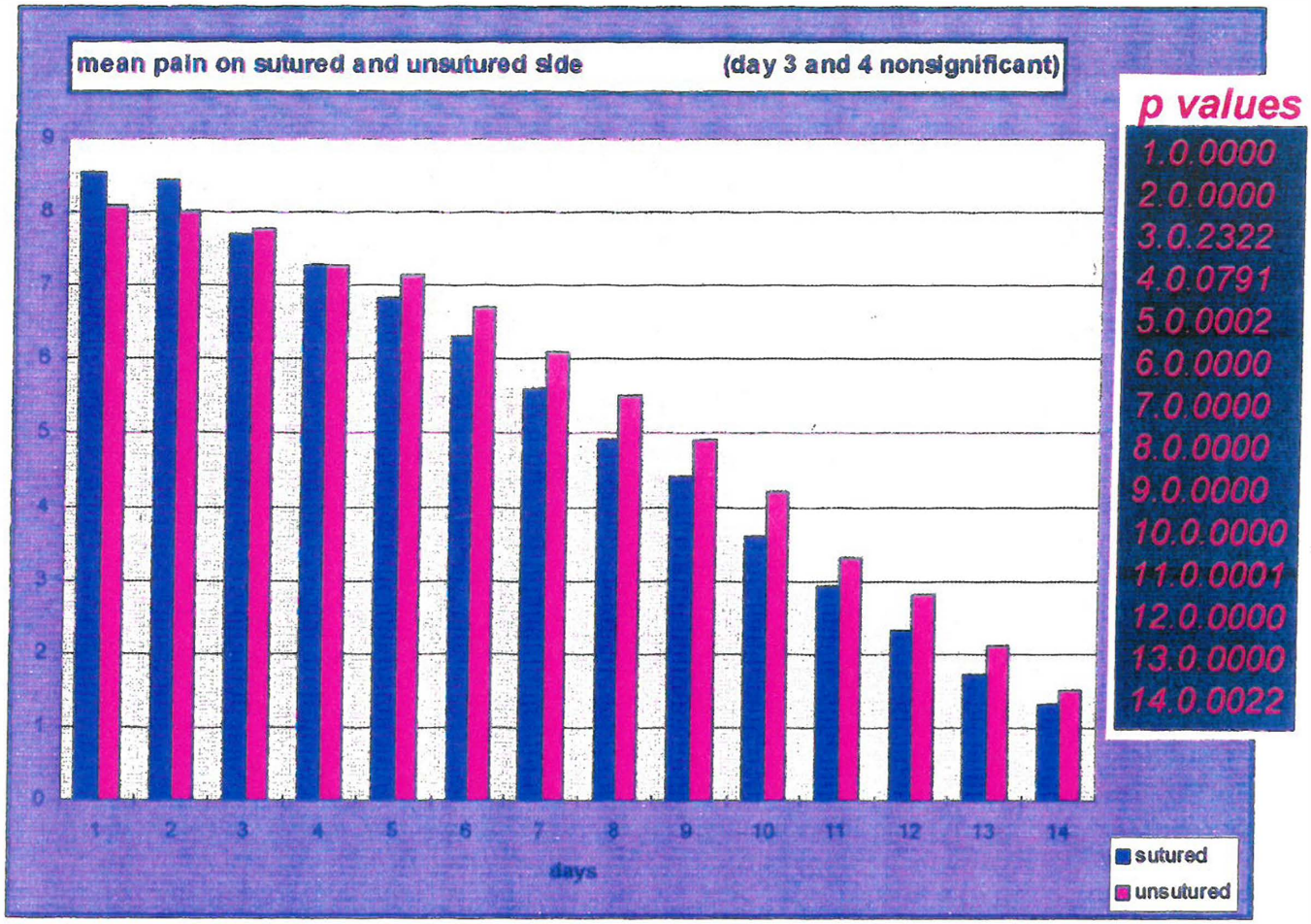

mean pain on sutured and unsutured side
(day 3 and 4 nonsignificant)
p values
1.0.0000
2.0.0000
3.0.2322
4.0.0791
5.0.0002
6.0.0000
7.0.0000
8.0.0000
9.0.0000
10.0.0000
11.0.0001
12.0.0000
13.0.0000
14.0.0022
days
sutured
unsutured

fig.1

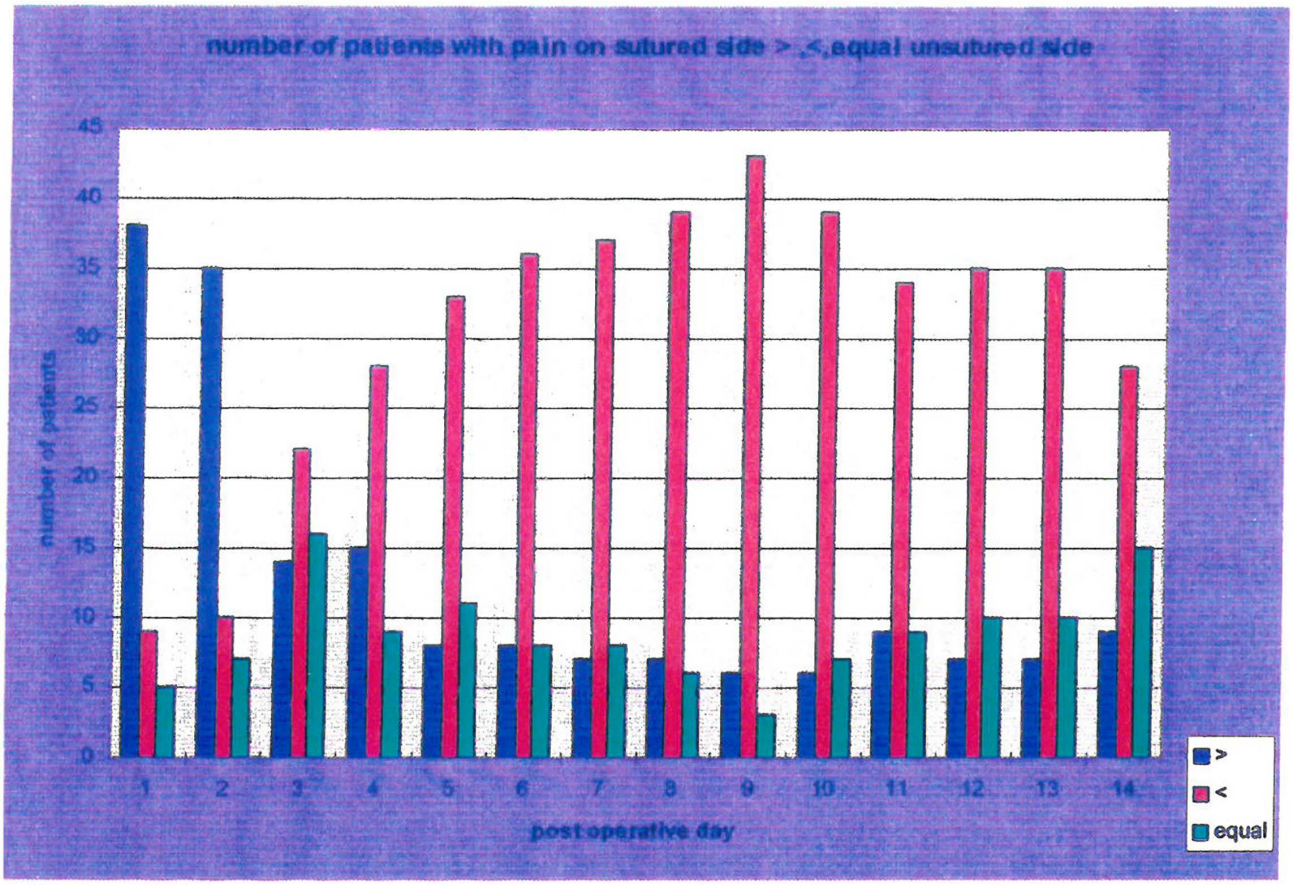

number of patients with pain on sutured side >,<,equal unsutured side
number of patients
post operative day
>
<
equal

fig.2

Control of Otalgia and Odynophagia

Otalgia and odynophagia show a similar pattern to the throat pain with a greater number of patients experiencing more otalgia and odynophagia on the sutured side (first 2 days). Later, from the third day, this situation reversed. On all days except the 3rd day for otalgia this was statistically significant ($p < 0.000353$)as analysed by Binomial probability test.

The figures 3 and 4 show the number of patients experiencing greater otalgia and odynophagia on the sutured and unsutured side over the 14 post-operative days.

Additional Time used for Suturing

Suturing of the pillars added on average 3 min. 37sec to the duration of the operation. Ranging from 2 to 4 minutes.

Number of times of diathermy use

Bipolar diathermy was used for 6 to 15 times (mean value = 8.37) on the sutured, and for 6 to 13 times (mean value = 8.38) on the unsutured side. This difference is not significant and could not influence the pain scores.

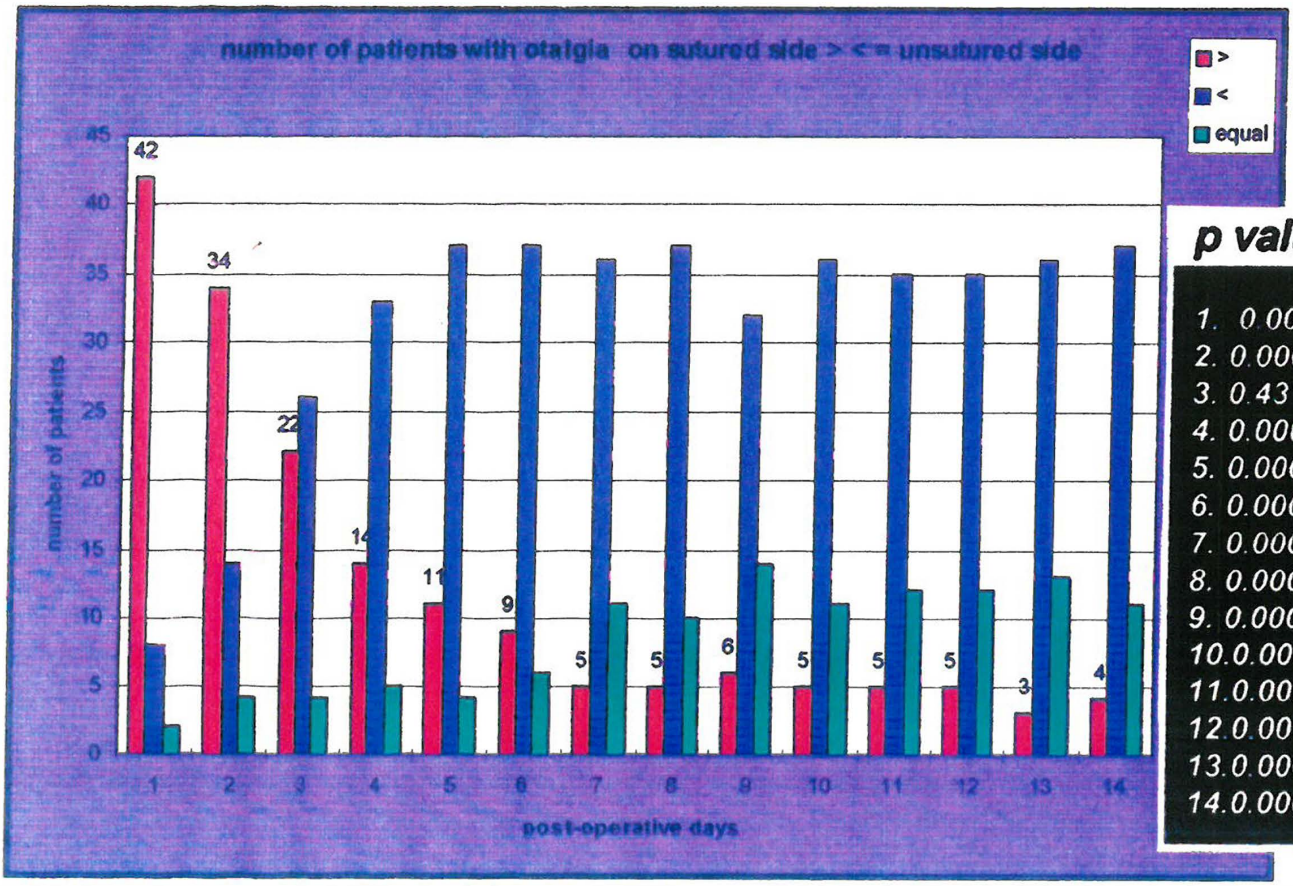

number of patients with otalgia on sutured side > < = unsutured side
>
<
equal
number of patients
post-operative days
42
34
22
14
11
9
5
5
6
5
5
5
3
4
p values
1. 0.000000
2. 0.000083
3. 0.431401
4. 0.000184
5. 0.000000
6. 0.000001
7. 0.000000
8. 0.000000
9. 0.000000
10.0.000000
11.0.000000
12.0.000000
13.0.000000
14.0.000000

fig.3

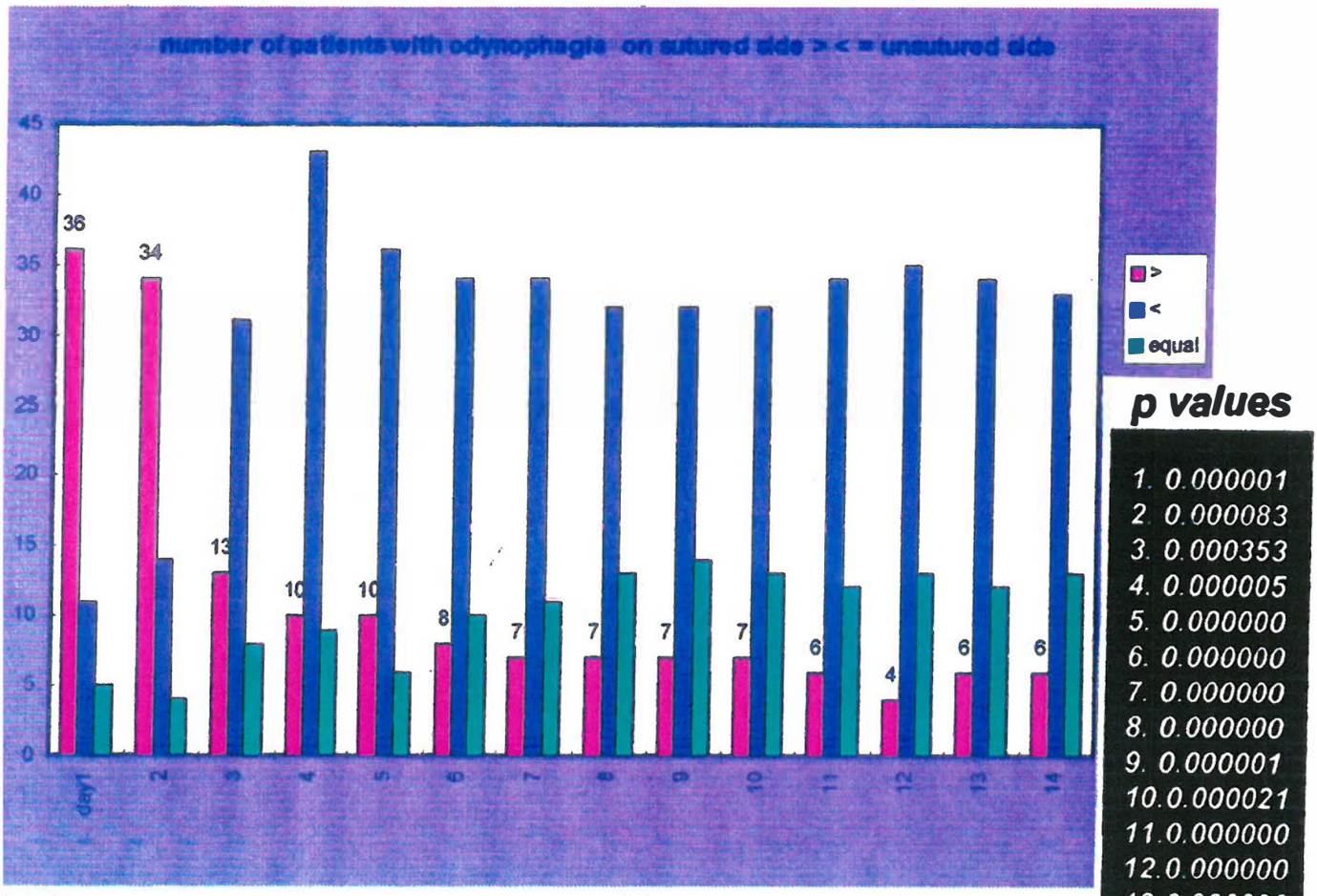

number of patients with odynophagia on sutured side > < = unsutured side
>
<
equal
36
34
13
10
10
8
7
7
7
7
6
4
6
6
p values
1. 0.000001
2. 0.000083
3. 0.000353
4. 0.000005
5. 0.000000
6. 0.000000
7. 0.000000
8. 0.000000
9. 0.000001
10.0.000021
11.0.000000
12.0.000000
13.0.000000
14.0.000000

fig.4

Appearance of the obliterated tonsillar fossa on the 14th post operative day

In most cases the sutured side resumed its usual post-operative appearance by the 14th post-operative day.

In five patients the obliterated fossae has partly opened up and in 1 case it was still obliterated on the 14th day.

The remnants of the sutures were removed in the ENT clinic and the fossae had opened up.

Complications

One patient developed a moderate secondary haemorrhage from the unsutured side on the 7th post operative day. He was treated by removal of the clot from the tonsillar fossa, application of H_2O_2 swabs and oral antibiotics. There were 6 cases of minor bleeding occurring between the 3rd and 8th day after surgery, which did not require any medical intervention. None of the patients in this series developed a palatal haematoma.

There were 3 cases of moderate throat infection treated with oral antibiotics.

None of the patients in this study developed any functional disability or required re-admission.

Most of the patients (45) considered this method as good in pain control, and would recommend it .

Additional Data

It was possible, from the data collected, to calculate the mean pain score for the sutured and unsutured tonsil fossae for 14 post-operative days.
The highest intensity of pain was found to be during the first 2 days, with progressive improvement over the next 12. See fig. 5

The mean number of paracetamol 500mg tablets taken daily was calculated and plotted in figure 6.
The results mirror the pattern of pain seen over the 14 post operative days, with gradual reduction in the number of tablets required for pain relief. However 4 patients still required some analgesia on the 14^{th} day.

Of 52 patients, 50 were able to resume normal activity within 14 days. The majority (33) required 6-10 days for recovery. The mean time for resumption of normal activity was day 7.

The time taken to resume normal activity, and number of patients are shown in fig. 7

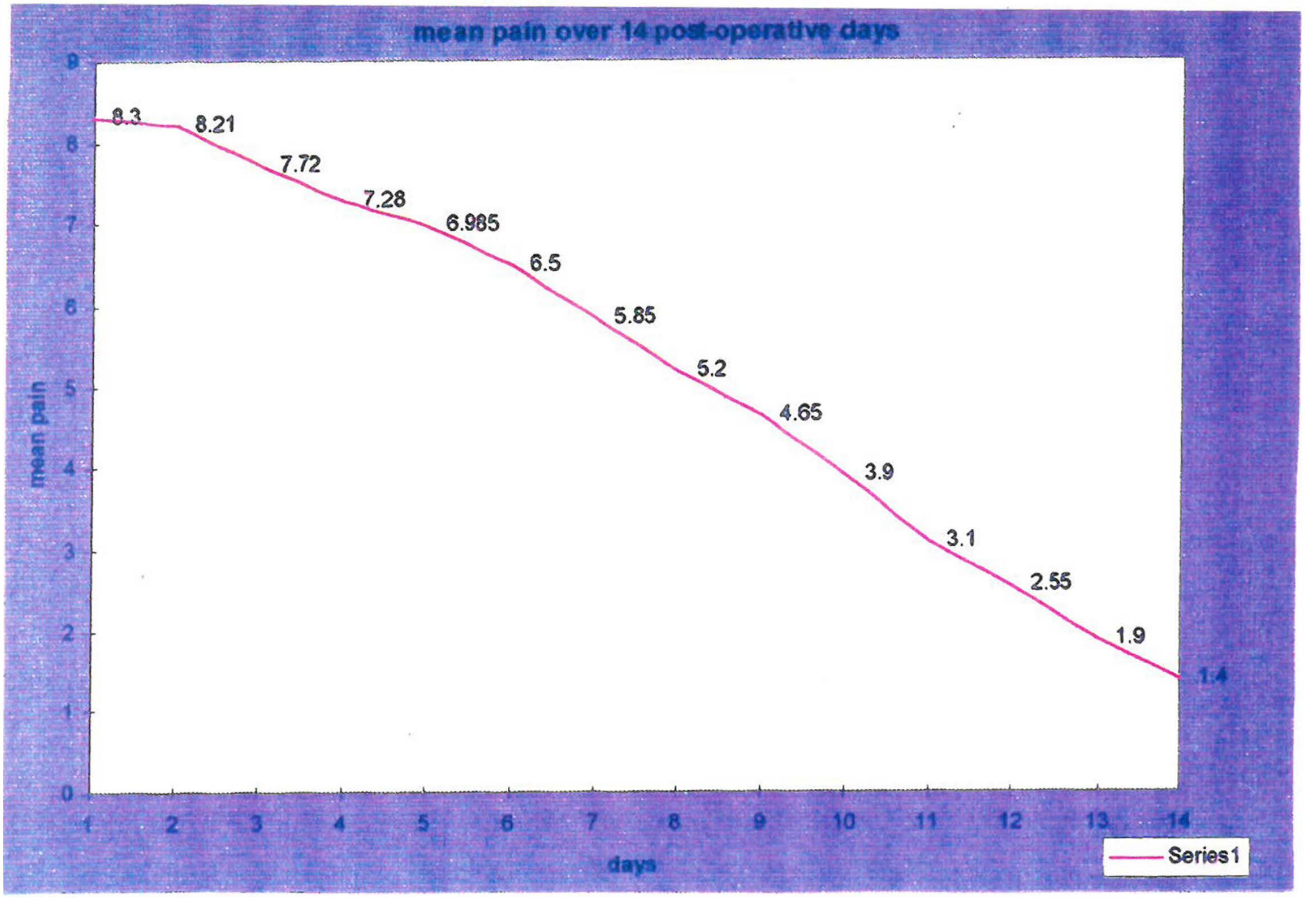
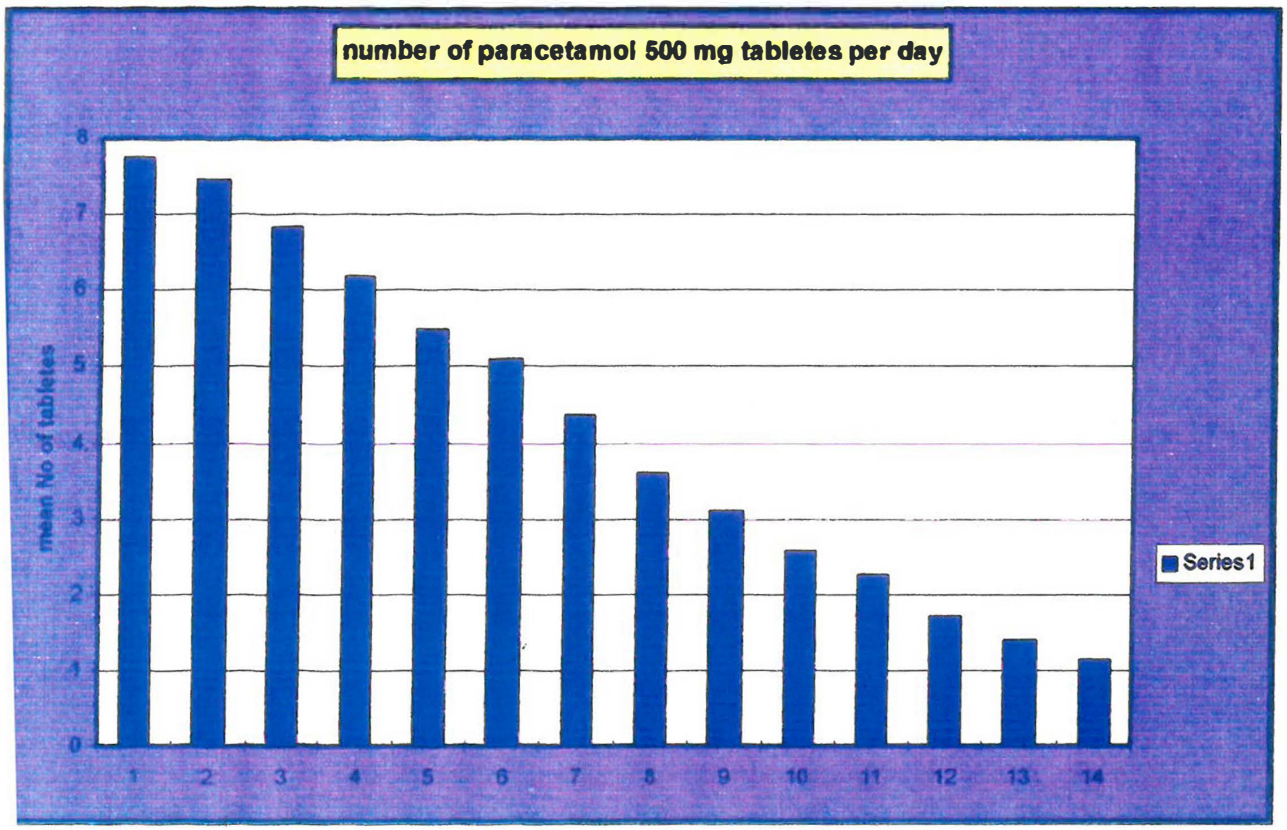

mean pain over 14 post-operative days
mean pain
days
8.3
8.21
7.72
7.28
6.985
6.5
5.85
5.2
4.65
3.9
3.1
2.55
1.9
1.4
Series1

fig.5


number of paracetamol 500 mg tabletes per day
mean No of tabletes
Series1

g.6

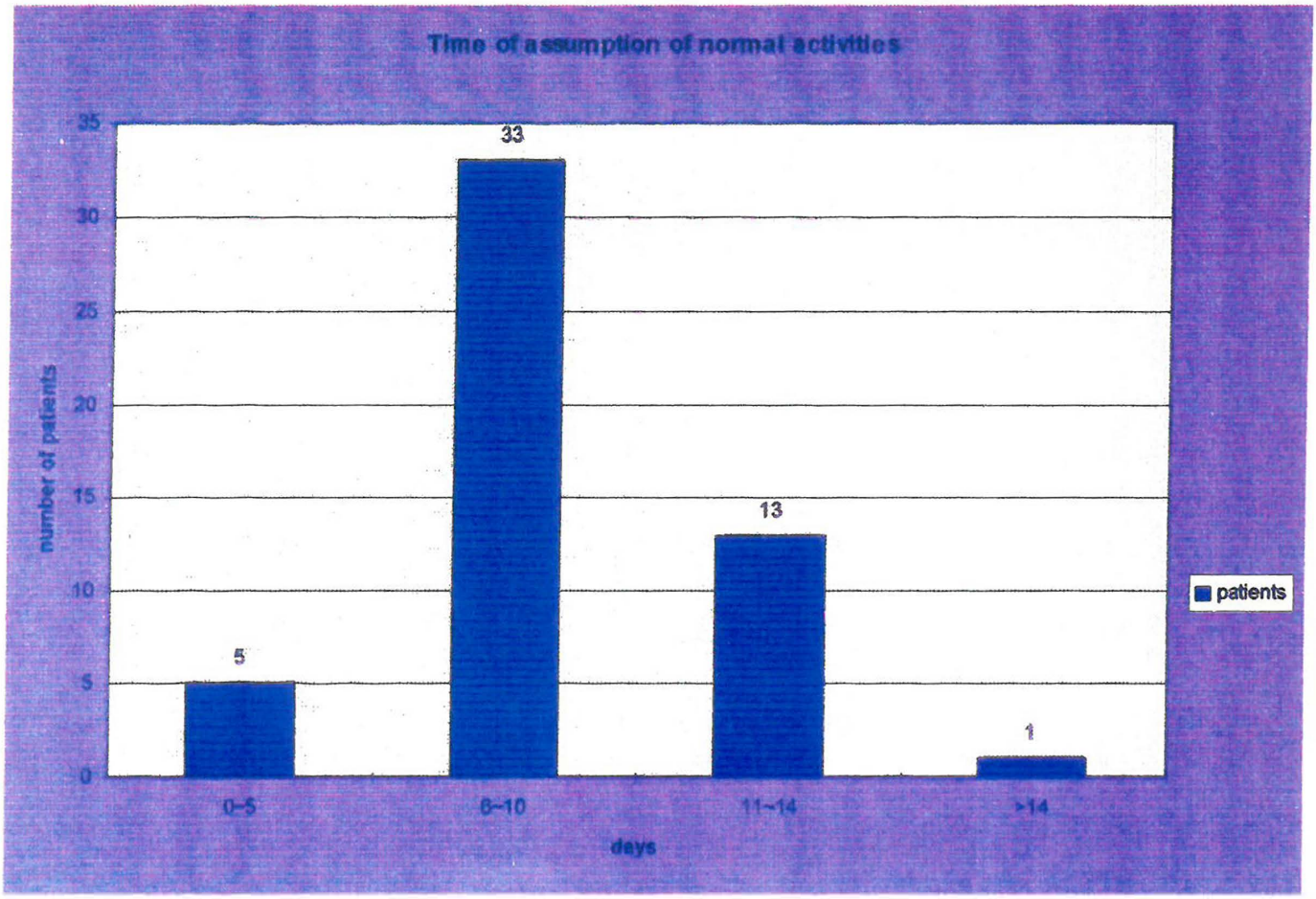

Time of assumption of normal activities
number of patients
35
30
25
20
15
10
5
0
33
13
5
1
0-5
6-10
11-14
>14
days
patients

fig.7

CHAPTER 5

Discussion

Tonsillectomy is one of the most common procedures in E.N.T Surgery.

It produces large areas of exposed muscle in the pharynx and results in considerable pain.

Throat pain and associated otalgia and odynophagia are causes of severe morbidity after tonsillectomy.

The pain makes chewing and swallowing difficult and leads to dehydration and potential secondary infection and haemorrhage.

The large number of methods described to decrease the pain indicates that none of them is satisfactory.

In this study it was demonstrated that suturing of the faucial pillars causes significant reduction in throat pain from the 5th day following tonsillectomy.

Statistically significant number of patients reported less pain on the sutured side compared to the unsutured side from the 5th postoperative day. However the majority of patients reported the sutured side to be more painful during the first and the second day. A similar pattern was observed in the control of odynophagia and otalgia associated with tonsillectomy.

This is in contrast to some reports (Weighill et al, 1986 and Ramjettan and Singh, 1996) in which more absorbable catgut was used without total obliteration of the tonsillar fossa. These studies did not show any significant difference in pain however they reported a few cases of palatal haematomas as a complication of the procedure.

This study has shown results similar to those reported by V. Nandapalan and T.C McIlwain (1995), however control of pain in this series appears to be slightly better, possibly because of the use of smaller and less traumatizing suture material.

Similarily in this study, there were no cases of the palatal haemetoma .This may be due to the fact that the dead space between the tonsillar pillars was obliterated with the technique used in the study.

The main disadvantage of tonsillar fossa obliteration is prolonged anaesthetic time (approximately 50% of the duration of the operation).

This, together with the price of the suture material will result in a considerable increase in the cost of tonsillectomy using the study technique, when compared to the standard technique.

CHAPTER 6

CONCLUSIONS

Suturing of faucial pillars is an effective technique in the control of post tonsillectomy pain.

Obliteration of the tonsillar fossa with more durable sutures for an adequate amount of time is associated with a significantly decreased severity of pharyngeal pain from the 5^{th} day after tonsillectomy.

However on the 1^{st} and the 2^{nd} post-operative days the sutured side appears to be more painful.

The method is not associated with any major complications and does not cause any functional disability although it prolongs the operation time significantly.

Weighing decreased morbidity against prolonged surgery time and increased costs it seems that suturing of the tonsillar pillars can be recommended as a good method of decreasing post-tonsillectomy pain.

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