

A COMPARATIVE STUDY OF MANUAL INCISION WITH RADIOSURGERY INCISION IN DACRYOCYSTORHYNOSTOMY SURGERY

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HOW TO CITE THIS ARTICLE:

Shailly Raj, Naveen Kumar, J. P. Purohit, Sushil Kumar. "A Comparative Study of Manual Incision with Radiosurgery Incision in Dacryocystorhynostomy Surgery". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 24, March 23; Page: 4169-4177, DOI: 10.14260/jemds/2015/600

ABSTRACT: MATERIAL & METHODS: This randomized, prospective study was carried out on patient attending out patients department of ophthalmology L.L.R. hospital (GSVM Medical College) Kanpur during the time period of 2 years. Detailed history, general examination & ophthalmic examination done. Then they underwent Dacryocystorhynostomy surgery. These patients divided into two groups the Group 'A' and Group 'B'. Group. A patients underwent the dacryocystorhynostomy surgery with manual scalpel incision and Group B patients underwent the surgery with radiofrequency tools. The subsequent follow up was done at the intervals at one week, 3 weeks, 6 weeks and 6 months. Some were followed more frequently whenever needed. **RESULTS:** The present study was conducted on 118 eyes of 102 patients, of these 56 eyes (48 patients) received skin incision with manual scalpel (Group 'A') and 62 eyes (54 patients) received skin incision with radiofrequency knife (Group 'B'). The intraoperative bleeding and mean surgical time per case was less with radi frequency knife that is in group B. There was also faster wound healing with more numbers cases of excellent scar quality on postoperative follow up in Group B. **DISCUSSION:** Intraoperative average numbers of gauze pieces used per case was less in Group B because of electrocoagulation action of radiofrequency tools. That is why the mean surgical time per case was less in Group B. Patients was compared for scar quality by giving them scores according to Manchester scar scale score and 60% patients in Group B achieves excellent scar quality scores in comparison to group A in which only 48% patients achieves excellent scar quality scores. **CONCLUSION:** There is less intraoperative bleeding and less mean surgical time per case and faster healing with excellent scar quality postoperatively in early and late follow ups with radiofrequency tools than manual scalpel.

KEYWORDS: Radiofrequency knife, cold cautery, dacryocystorhynostomy surgery, lectrocoagulation.

INTRODUCTION: Radiosurgery is an excellent surgical tool for performing occuloplastic procedures and orbital surgery because it coagulates blood vessels as it cuts through tissues. This allows less bleeding during surgery which translates in better visualization of the tissue planes and a more rapid procedure. It can be used to treat most of the skin lesions with ease in less time with clean surgical field due to adequate haemostasis and with minimal side effects and complications.

Radiofrequency ablation (Radiosurgery, high frequency electrosurgery) is a dermatosurgical procedure that aims at the surgical management of benign and malignant skin conditions by using various forms of alternating current at ultra-high frequency (500-4000 K Hz). It is also popularly known as "poor man's laser" or "Cold Cautery". The basic equipment comprises a radio surgical unit with a ground plate (Dispersive electrode), foot switch and hand piece. It is provided with tungsten electrodes of various shapes and sizes with bendable shafts that are fitted into hand piece. A suction device for the evacuation of smoke in extensive surgery is also attached to the equipment. Radiofrequency uses various waveforms with the following tissue effects:

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- a. Electrosection.
- b. Deep tissue destruction (Electrocoagulation).
- c. Superficial tissue destruction (Electrodessication and Electrofulguration).

AIMS AND OBJECTIVES:

- To compare the amount of bleeding during surgery between incision with scalpel and with radiosurgery.
- To compare the surgical time of procedures between procedures with manual incision and procedures with radiosurgery by the same surgeon performing similar surgery.
- To assess the wound healing between two types of procedures during same period of follow up in same age groups of patients in similar surgical procedures.
- To assess the quality of postoperative scar formation between both types of surgery at same follow up interval and in same age group of patients.

MATERIALS AND METHODS: This randomized, prospective study was carried out on patients attending OPD of ophthalmology department L. L. R. hospital (GSVM Medical College) Kanpur during the time period of 2 years. Then in the selected patient detailed history, General examination and ocular examination carried out to make a proper diagnosis. Other detailed ocular and extraocular examination for any abnormal associated ocular findings.

Following patients were included in the Study:

- Patients between Age 20 years to 60 years.
- Patients had complains of constant watering and discharge from one eye or both eyes.
- Patients had regurgitation test positive on affected side.
- On syringing test there was nasolacrimal duct block but canaliculi was patent on affected side.

Exclusion Criteria:

- Patients with punctal and canalicular block.
- Patients having severe deviated nasal septum.
- Patients having localized nasal pathology.
- Diabetes mellitus with uncontrolled or fluctuating blood sugar.
- Patient with any bleeding disorder.
- Acute infective stage of local site of skin lesion.
- Patients with acute illness.
- Patients with any collagen vascular disorder.
- Patients with raised blood pressure.
- If patients were operated for same procedure by only one incision method.
- If patient is on aspirin treatment then aspirin should be stopped at least 1 week before the planned surgery.

These included patients divided into two groups the Group 'A' and Group 'B'.

Group A: In this group the patients were selected who underwent the dacrycystorhinostomy surgery with manual scalpel incision.

Group B: In this group the patients are selected who underwent the dacryocystorhinostomy surgery with radiofrequency tools.

PREOPERATIVE INVESTIGATIONS:**Blood:**

- TLC, DLC, ESR, Haemoglobin.
- Fasting and post prandial blood sugar.
- Serum creatinine.
- Bleeding time and clotting time.

Urine:

- Routine.
- Microscopic.
- Patient with normal all above investigation are included in the study.
- On the day of operation.
- Proper consent taken with explained prognosis.
- Xylocaine sensitivity done.
- Blood pressure and pulse rate monitoring done.
- Morning dose of antibiotic drug ciprofloxacin 500 mg oral.

Anaesthesia: All the patients included in the study underwent the dacryocystorhinostomy surgery under local anaesthesia given by 2% xylocaine 2-3 ml subcutaneously at the site of incision.

OPERATIVE PROCEDURE:**The operation carried out in the following Steps:**

- First cleaning, painting and draping of local area with betadine solution done.
- Incision is marked with scalpel (15 No. Blade) in patient selected in group A and with radiofrequency knife in patient selected in group B.
- For the assessment of amount of bleeding during the operative procedure the standard size cotton gauze pieces used in all selected surgeries to clear the operating field.
- Surgical time assessed in all surgeries individually starting from just marking of the incision with either scalpel or radio frequency knife up to the closure of wound with sutures.

Post-operative Care: Bandage is opened on 2nd post-operative day. After dressing the detailed local examination is carried out with particular reference to:

- Wound apposition.
- Sutures are intact or not.
- Any pus or serous fluid coming out from the suture line.
- Any fresh bleeder.
- Pain and tenderness.
- Surrounding tissue edema.

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The subsequent follow up was done at the following Intervals:

1. one week.
2. 3 weeks.
3. 6 weeks.
4. 6 months.

Some were followed more frequently whenever needed.

Following parameters were checked on each visit:

1. Quality of scar formation.
2. Any wound gap any serous fluid or discharge or pus coming out from suture line.
3. Local area tenderness and pain.
4. Surrounding skin condition seen for any edema and sign of necrosis.

Scar quality evaluated at final follow up examination by using Manchester scar scale score (MSSS).

Visual analogue scale		
A.	Colour perfect	1
	slight mismatch	2
	obvious mismatch	3
	gross mismatch	4
B.	Matte	1
	Shiny	2
C.	Contour	
	Flush with surrounding skin	1
	Slight proud/indented	2
	Hypertrophy	3
	Keloid	4
D.	Distorsion	
	None	1
	Mild	2
	Moderate	3
	Severe	4
E.	Texture	
	Normal	1
	just palpable	2
	firm	3
	hard	4

Based on this scale patients are divided into following 4 groups regarding scar quality:
Excellent: max score of 18.

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Good: Score 12.

Fair: Score 8.

Worst: Score 5.

RESULTS: In this study total 118 eyes of 102 patients of chronic dacryocystitis were included of which 86 patients having complain in one eye so they underwent the DCR surgery unilateral and 16 patients had chronic dacryocystitis both eyes so underwent DCR surgery bilateral.

	Age (in years)	Group A	Group B	Total	Percentage (%)
1.	20 – 40	15	14	29	28%
2.	40 – 60	33	40	73	72%
		48	54	102	

Table 1: Age distribution

	Sex	Group A	Group B	Total	Percentage (%)
1.	Male	18	16	34	33%
2.	Female	30	38	68	67%
		48	54	102	

Table 2: Sex distribution

Patients included in the study between the ages 20years to 60 years and there then they were divided randomly in to two groups' i. e., Group A and Group B. There was 73 patients (71.5%) were between age of 40 to 60 years and 29 patients (28.43%) were between ages of 20 to 40 years. There was out of 102 patients, 34 males (33.33%) and 68 females (66.7%).

	Number of gauze pieces	Group A Number of cases	Percentage (%)	Group B Number of cases	Percentage (%)
1.	<10	0	0%	18	29%
2.	10 - 15	8	14%	35	56.4%
3.	15 - 20	28	50%	7	11.3%
4.	>20	20	35.7%	2	3.2%
		56		62	

Table 3: Assessment of intraoperative bleeding with average number of standard size gauze pieces

28 patients (50%) of all in group A used 15-20 pieces per case in comparison to Group B where majority of patients i. e. 35 patients (56%) used 10-15 gauze pieces per case. In Group A 36% patients used >20 gauze pieces but in Group B only 3.2% patients used >20 gauze pieces and 29% patient used <10 gauze pieces.

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	Mean surgical time (min.)	Group A Number of cases	Percentage (%)	Group B Number of cases	Percentage (%)
1.	<30	1	1.8%	15	24.2%
2.	30 - 40	6	10.7%	35	56.5%
3.	40 - 50	15	26.7%	9	14.5%
4.	50 - 60	27	48.2%	3	4.8%
5.	>60	7	12.5%	0	0%
		56		62	

Table 4: assessment of surgical time (min) in both Groups

In Group A in the majority of patients i. e. 48% the mean surgical time was 50-60 min, in only 2% patients it was <30 min and in 13% it was >60 min but in Group B the majority of patients (57%) had surgical time 30-40 min, in 24% patients <30 min and none of the patient had surgical time >60 min.

	Mean time interval (days)	Group A Number of cases	Percentage (%)	Group B Number of cases	Percentage (%)
1.	5 days	3	5.3%	20	32.2%
2.	6 days	10	17.9%	28	45.1%
3.	7 days	18	32.1%	10	16.1%
4.	8 days	25	44.6%	4	6.4%
		56		62	

Table 5: Assessment of mean time interval (in days) from surgery to suture removal without wound gap in both groups

The mean time interval (in days) from surgery to suture removal without wound gap was 8 days in majority of patients (45%) in comparison to Group B where it was 6 days in majority (45%). In 32% patients in Group B time interval up to 5 days which was very less in comparison to it was in 5.3% patients of group A.

Sl. No.	Scar quality	Group A	Percentage (%)	Group B	Percentage (%)
1.	Excellent	27	48.2%	37	59.7%
2.	Good	16	28.6%	21	33.9%
3.	Fair	10	17.8%	3	4.8%
4.	Worst	3	5.3%	1	1.6%
	Total	56		62	

Table 6: Assessment of Scar quality on 3rd week in both groups

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Sl. No.	Scar quality	Group A	Percentage (%)	Group B	Percentage (%)
1.	Excellent	27	48.2%	37	59.7%
2.	Good	16	28.6%	21	33.9%
3.	Fair	10	17.8%	3	4.8%
4.	Worst	3	5.3%	1	1.6%
	Total	56		62	

Table 7: Assessment of Scar quality on 6th week in both groups

Sl. No.	Scar quality	Group A	Percentage (%)	Group B	Percentage (%)
1.	Excellent	27	48.2%	37	59.7%
2.	Good	16	28.6%	21	33.9%
3.	Fair	10	17.8%	3	4.8%
4.	Worst	3	5.3%	1	1.6%
	Total	56		62	

Table 8: Assessment of scar quality on 6th month in both groups

On the basis of Manchester scar scale score (MSSS) in Group A 48% had excellent and 29% had good quality of scar present in comparison to Group B where 60% patient had excellent and 40% had good quality of scar. The results were same on 3rd week, 6th week and 6th month follow up.

DISCUSSION: RADIOSURGERY is the passage of high frequency radio waves through tissue for the purpose of dissection. It was used in dermatological procedures, ENT, Surgery. In ophthalmology its use is new and it is tried in oculoplastics and orbital surgeries.

In this study we used radiofrequency knives for skin incision for DCR surgery. We studied 118 eyes (cases) of 102 patients had chronic dacryocystitis between the age of 20-60 years. There was 72% patients were >40 years and 67% were females. This indicates that chronic dacryocystitis had more common with middle aged women.

On assessment of intraoperative bleeding there was 86% of patients used >15 gauze pieces per case in group A but in group B 85% patients used <15 gauze pieces per case because of electrocoagulation function of radiofrequency knife that was same as the study results of Boughton RS¹ who described less bleeding with better cutting and coagulation ability with minimal tissue trauma. In the study by Javate RM² there was also much less bleeding with radiofrequency knife in DCR surgery.

The mean surgical time was assessed per case >40 min in 88% patients in Group A and <40 min in 81% patients of group B. It indicates that surgical time was much less with radiosurgical tools as it gave better visualization and rapid procedure due to good hemostasis. Bennett RG³ described radioablation can be used with ease in less time with clean surgical field due to adequate hemostasis. Silverman⁴ also noticed decreased operative time with radiofrequency tools. The Older JJ⁵ also described better visualization and rapid procedure in 1000 oculoplastics procedures.

On assessment of mean time interval (In days) from surgery to suture removal without wound gap was also very less in radiofrequency tools surgery cases. It was >7 days in 79% of patients in group A in comparison to group B in which it was <7 days in 77% patients.

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Same as the study of Boughton RS¹described faster healing rate with radiofrequency tools. Bridenstine JB⁶ also found aesthetically pleasant scar and rapid wound healing.

We compare the scar quality of patients in group A and group B on 3rd week, 6th week and 6 months by giving them scores according to Manchester scar scale. We found that only 48% patients achieved excellent scar in group A in comparison to group B where 60% patients achieved excellent scar. These was same as the study of Gallenga PE⁷ who described that in radiosurgery the incision was much neat and edges approximate well with sutures so there was better wound healing and good scar quality. The results was also same in the study of Rous P.⁸

CONCLUSION: There is less intraoperative bleeding and good hemostasis due to electrocoagulation action of radiofrequency knife. This causes clear operating field leads to less surgical time. The lateral tissue damaged was also noticed less with radiofrequency knife so that there was faster healing with excellent scar quality postoperatively in early and late follow ups with radiofrequency tools than manual scalpel. This study concluded that radiofrequency knife gives better results for skin incision both intra-operatively and postoperatively than manual scalpel.

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FINANCIAL OR OTHER

COMPETING INTERESTS: None

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Date of Submission: 20/02/2015.
Date of Peer Review: 21/02/2015.
Date of Acceptance: 11/03/2015.
Date of Publishing: 23/03/2015.