

# Study of Efficacy of Radiofrequency Cautery in Treatment of Xanthelasma

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## ABSTRACT

**Background-** Xanthelasma is a most common xanthoma presented clinically as a yellowish oval papule and plaques over and around periorbital region. Only from cosmetic point of view do patients need to remove these lesions. Our study aimed to evaluate the efficacy of radiofrequency cauterization as a treatment modality in xanthelasma.

**Methods-** It is a prospective interventional study in which 40 patients with 114 lesions were included. Radiofrequency (RF) cautery was done after local anaesthesia is given. The study was conducted from August 2013 to August 2014 at a tertiary care hospital. Before and after therapy, pictures were taken, and patients were checked on every four to six weeks.

**Result:** Forty patients with 114 xanthelasma lesions were included in the study. The patients were mostly in their fourth or fifth decade, with ages ranging from 29 to 62. In the study group, the male to female ratio was 1:2. Xanthelasma was most commonly found over the inner and upper eyelids, followed by the outer and lower eyelids. Bilateral involvement was seen in most cases. The majority of patients were classified as grade-3, indicating xanthelasma over the medial side of the upper and lower eyelids.

**Conclusion-** RF cauterization is a cost-effective xanthelasma palpebrarum treatment with a lower recurrence rate. It's safe, minimally complication-prone, and often associated with underlying plasma lipid disease. Despite its potential, there's no approved long-term treatment alternative. RF cauterization is convenient for dermatologists.

**Key-words:** Cautery, Electrosurgery, Eyelid lesions, Hypercholesterolemia, Palpebrarum, Radiofrequency, Xanthelasma, Yellowish lesions

## INTRODUCTION

Xanthelasma palpebrarum is a planar xanthoma that appears clinically as yellow macules, soft papules, or plaques on the upper eyelids [1,2]. They are not a disease but rather symptoms of various lipoprotein problems or occur without an underlying metabolic defect [2].

The range of reported xanthelasma incidences is 0.56 to 1.5% [3-6]. The peak occurrence of the condition occurs in the fourth and fifth decades of life, and women are more typically affected [5]. Low self-esteem and confidence can result from this illness, however effective therapy has been shown to improve quality of life [7]. Because these lesions are noticeable, many patients seek cosmetic removal.

Xanthelasma may be associated with genetic disorders like familial hypercholesterolemia (type II) and familial dysbetalipoproteinemia (type III), secondarily disorders like monoclonal gammopathies [8].

According to Connor WE, Connor SL lesions respond well to dietary control and drug therapy but there is no

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satisfactory medical management of xanthelasma [9-11]. Isolated xanthelasma palpebrarum may be cauterised or excised if not associated with any systematic disturbances. In these circumstances, removing xanthelasma is typically a cosmetic problem. Surgical excision, ablative laser therapy, trichloroacetic acid, and cryotherapy are all viable treatment options [12-15]. But all these treatment options have certain limitations.

Radiotherapy cauterisation and laser are two relatively new elegant surgical modalities now available to dermatologists for xanthelasma treatment [16,17]. So, radiofrequency cauterization (low-voltage RF) was considered to offer another treatment option or modalities and evaluate its efficacy.

The term "electrosurgery" is a general term to describe the different procedures employing electrically generated heat. This heat may be generated using either galvanic or alternating current. It has been in practice for many years. The radiosurgical unit is a recent innovation with a frequency of 3.8 MHz. It is preferable to electrocautery and offers the added benefit of coagulation. This tool produces minimal collateral damage, resulting in cosmetically appealing scars.

## MATERIALS AND METHODS

It was an interventional prospective study. The patients were selected from the Department of Skin and V.D outpatient clinic at Tertiary Care Hospital from August 2013 to August 2014.

**Inclusion criteria-** Patients with xanthelasma who had not received any kind of treatment or intervention before the commencement of the study were included.

**Exclusion criteria-** Individuals with periorbital active herpes simplex lesions, scars, keloids, anticoagulant medication use, pacemaker implant history, skin phototype IV or V, allergy history, and patients with systemic illness like uncontrolled HTN, DM, mental disorder, patient not willing for follow up after initial visit were excluded from the study.

**Methodology-** Standardized digital images were obtained immediately before the procedure, three months later, and six months later and reviewed independently by two dermatologists. The identical photographer captured all the photos using the same camera (Nikon D7100, Nikon Inc., Tokyo, Japan) at set

angles and a fixed distance of 15 cm from the patient's face. Depending on the size and location of the lesion, the patients were divided into four grades [15]. Only the top eyelids were affected by grade I lesions. Lesions of grade II extended to the canthus medialis. On the medial side of the upper and lower eyelids, grade III lesions appeared. Diffuse lesions on the medial and lateral sides of the patients' top and lower eyelids were present in Grade IV patients.

Details of symptoms, duration, site, and family history of similar lesion were recorded. Before therapy, the location and number of periorbital skin lesions were noted. A serum lipid profile was performed with regular diagnostics. During and after treatment, patients were asked to rate their level of discomfort as none, mild, moderate, or severe. Treatment efficacy was evaluated using Al Aradi's 5-point scale with photographic assessment: 0% for no improvement, 0-25% for mild, 25%-50% for moderate, 50%-75% for good response, and 75%-100% for excellent response.

Adverse reactions included discomfort, swelling, pruritus, burning feeling, and erythema. Complications during the follow-up period were hypopigmentation, hyperpigmentation, and recurrence.

## Radiofrequency Cauterization

**Preoperative steps-** When substantial RF procedures are planned, aspirin should be discontinued at least three days before the scheduled surgery date. Priming with Retinoic acid 0.025% or Hydroquinone 2% was performed on facial lesions in a person prone to post-inflammatory pigmentation. In instances with a recent history of Herpes labialis, prophylactic Acyclovir or Valacyclovir were administered (starting the day before surgery and continuing for one week).

**Operative steps-** The area was cleaned with betadine lotion. 30min before the procedure, desired lesions were infiltrated with local anaesthesia 1% lignocaine and adrenaline. Lesions were ablated using dual-frequency 3.8-MHz radiofrequency (RF) surgical equipment with a completely filtered and rectified waveform and a power setting of 2 to 3. The electrodes were sterilized by keeping them in glutaraldehyde solution. Eye was protected by gauze pad.

Magnifying loop and proper light setup arrangements were done. The patient was made understand appropriately about the procedure. Proper resting support for good instrument control was done. The desired electrode was fastened to the handpiece. The electrode was placed on the saline-soaked gauze, and the radiofrequency equipment was turned on and off to ensure proper functioning. The tissue was wetted before radiowave transmission. This reduces tissue resistance. The handpiece was held in a pen-like position, and the

electrode's tip was quickly pressed into the tissue. The electrode tip's contact time with the tissue should be brief. A gentle feather touch was applied with no hand pressure. After each use, the electrode's tip was rubbed against the rough surface of the saline-soaked gauze to remove any debris or dirt. This helps to clean the electrode and also partially disinfect it. All the yellow tissue was removed under magnifying glass. Bleeding was controlled by using the coagulation mode (Fig. 1).



**Fig. 1:** Perioperative procedures with RF needle

Factors associated with evaluating clinical response was include xanthelasma thickness, surface area, pigmentation, and postsurgical scar or pigmentation. The clinical assessment of xanthelasma was based on scale measurement and the Patient and Observer Assessment Scale. Post-treatment follow-ups were done at 1, 3 and 6 months and photographs were taken with consent at the lesion site.

**Post-operative care-** Preventive antibiotics were usually unnecessary unless there was an infected lesion. Analgesics were used in a few occasions. In some cases, fresh bleeding patches appeared shortly following the surgery. All patients were then directed to apply Mupirocin 1% ointment twice daily to the treated areas for one week.

**Statistical Analysis-** Tables and figures show continuous data's average (mean  $\pm$  standard deviation) and the quantity and percentage of dichotomous data. The Chi-square significance test was used to compare proportions. The Statistical Package for Social Science (SPSS) was used for data analysis.

**Ethical Approval-** Institutional Ethical Committee approved the study. Written consent for their participation in the survey was taken.

**RESULTS**

Total 40 numbers of patients were included in our study. Age of patients ranged from 29 yrs to 62 yrs. The majority of patients were between 4<sup>th</sup> to 5<sup>th</sup> decade (Table 1). Male: Female ratio in the study group was 1:2 (Table 2).

**Table 1:** Age distribution of patients.

Age group	No. of patient	Percentage (%)
20-40yrs	11	27.5
40-60yrs	20	50
60-80yrs	9	22.5

**Table 2:** Sex distribution of patients.

	No. of patient	Percentage (%)
Male	13	32.5
Female	27	67.5

In our study, most patients developed xanthelasma over the inner canthus, followed by the upper eyelid. Almost equal number of patients developed xanthelasma over the outer canthus and lower eyelid. Least number of patients were developed lesion over periorbital region. In most cases, bilateral involvement was seen (Table 3).

**Table 3:** Site of involvement.

Site of involvement	No of patient	Unilateral	Bilateral	Percentage (%)
Inner	14	5	9	35
Upper	10	2	8	25
Lower	7	1	7	17.5
Outer	6	3	3	15
Periorbital	3		3	7.5

In our study, the maximum number of patients was in grade-3 (xanthelasma over medial side of the upper eyelid and lower eyelid). Three patients were found in grade-4 (diffuse involvement). Ten patients were found in grade-1 (only upper eyelid) (Table 4).

**Table 4:** Grading of the patient.

Grade	Site	No of patient
Grade-1	Lesions on the upper eyelids	10
Grade-2	Lesions extended to the medial canthal area	0
Grade-3	Medial side of the upper and lower eyelids	17
Grade-4	Medial and lateral sides of the upper and lower eyelids.	3

In our study we found 10 xanthelasma patients were associated with hypertension and 8 number of patients were associated with diabetes (Table 5).

**Table 5:** Associated disease in xanthelasma patients.

Familial hypercholesterolemia	0
Diabetes	8
Hypertension	10
Coronar artery disease	0
Cholelithiasis	0

In our study we found raised lipid level in 45% of patients. Out of that 12 patients were in the age group of 20-40 years and 6 patients were in the age group of 40-60 years. So, most of the study group patients were middle age (Table 6).

**Table 6:** Raised lipid levels of patients.

Age group (Yrs)	No. of patient	Percentage
0-20	0	0
20-40	12	30
40-60	6	15
60-80	0	0
80-100	0	0

Twenty patients showed good improvement. Thus, significant improvement was seen in about 50% of patients ( $p = 0.0001$ ). 13 patients in our study group showed excellent response. 2 patients showed mild response and 5 patients showed moderate response (Table 7).

**Table 7:** Response of treatment about Al Aradi's study of 5-point scale with photographic assessment.

Al Aradi's study (%)	Result	No. of pt in present study	Percentage (%)
0	No Result	0	0
0-25	Mild	2	5
25-50	Moderate	5	12.5
50-75	Good	20	50
75-100	Excellent	13	32.5

In our study, very minimal side effect was noted. Two patients showed hyperpigmentation, another two patients showed new lesions on the other side of eye and recurrence was seen in two numbers of patients. Scarring was seen in 1 patient and hypopigmentation in 1 patient (Table 8).



**Table 8:** Complications associated with xanthelasma patients.

	No. of pt	Percentage (%)
Hyperpigmentation	2	5
Hypopigmentation	1	2.5
New lesion at another site of eye	2	5
Scarring	1	2.5
Recurrence	2	5

## DISCUSSION

This one-year clinical study was carried out in the outpatient clinic of the Department of Dermatology at tertiary care hospital in a precise and scientific manner to know the efficacy of radiofrequency cauterization in xanthelasma. It is a useful and cost-effective method for treating various skin problems that would otherwise need expensive ablative lasers. However, in the Indian subcontinent, there have only been a few credible papers establishing the efficacy of RF surgery and a few tiny anecdotal reports.

The general view is that middle-aged people are affected mainly by xanthelasma, though it can occur at any age between 15-70 yrs. Male to female ratio in the study group was 1:2. Many authors observed that xanthelasma is more common in females. Gangopadhy <sup>[6]</sup> and other authors <sup>[18,19]</sup> have also reported a higher prevalence in females. This could be because women are more concerned with their appearance. The upper eyelid and the region around the inner canthus are the most common sites of involvement in our study, but in severe hypercholesterolemic conditions (e.g., familial hypercholesterolemia), they can occur circumferentially or on the outer aspects of the eye, ranging in length from 2 to 30 mm.

In our study, the maximum number of patients was in grade-3 (xanthelasma over medial side of the upper eyelid and lower eyelid). 2011 British research of nearly 13,000 persons discovered that patients with xanthelasma were more likely to develop significant cardiovascular disease (CVD) and have serious, potentially fatal heart attacks within the next ten years. Chhetri and Reddy <sup>[18]</sup> discovered a positive family history

in 8.9% and 9.8% of cases, respectively. We found 10(25%) xanthelasma patients were associated with hypertension and 8(20%) patients were associated with diabetes Chhetri <sup>[20]</sup> and Gangopadhy <sup>[6]</sup> reported CVD and hypertension in patients of xanthelasma palpebrarum (XP) in their studies.

In our study, we noted that 35% of patients had raised serum lipid levels. Reddy <sup>[18]</sup> from India also reported elevated lipid levels in 57.8% of patients. Pedace and Winkelmann <sup>[21]</sup> reported higher lipid levels in 58.0% of patients from western countries.

Twenty patients (50%) showed improvement in our study about Al Aradi's 5-point scale survey with photographic assessment. Dincer *et al.* published the first study on using low-frequency radiofrequency (RF) to treat XP. Two-thirds of their patients showed moderate to excellent results. In Reddy *et al.*'s study comparing trichloroacetic acid (TCA) cauterization to RF ablation, instead of placing the RF electrode superficially, the lesions were ablated until a pink base appeared. Secondary intention led to future healing. However, in this study, scarring occurred in 40% of those with RF ablation compared to our research, which was 2.5%. However, surgical removal frequently necessitates a high level of skill and poses a risk of scarring, subsequent infection, and haematoma development <sup>[22]</sup>. Most dermatologists are skilled in operating the RF device, an easily accessible and reasonably priced instrument.

Complications were less informative of hyperpigmentation (5%), hypopigmentation (5%), and scarring (5%) compared to other modalities of treatment. Surgery near the eyelids may cause ectropion, retraction of the eyelid, and damage to the actual eye. Chemical cauterization and cryotherapy can cause severe scarring and discoloration of the skin <sup>[23,24]</sup>.

## CONCLUSIONS

Around 50% of xanthelasma patients found an underlying plasma lipid disease brought on by an aberrant lipoprotein or apolipoprotein. Consequently, individuals may need to be followed up on for related morbidities and should be examined for underlying causes of hyperlipidemia. Radiofrequency cauterization was significantly efficacious ( $p < 0.01$ ) in xanthelasma. The procedures were nearly safe, with only a few complications, and most of the side effects were mild. Xanthelasma of a face as a cosmetic disability certainly

does a lot of harm to the patient's body image and self-esteem. A dermatologist who is just starting in practice can perform RF surgery with little setup, and it requires fewer sessions overall, making it an incredibly affordable treatment option.

However, recurrence frequently occurs with all therapy procedures, and there still lacks an approved long-term treatment alternative for xanthelasm palpebrarum.

### LIMITATIONS

Less number of patients was included in our study. Comparison with other modalities of treatment was not done.

### CONTRIBUTION OF AUTHORS

**Research concept-** Bisoyi Diptiranjani, Khan Sahid Abdul, Puhan Ranjan Manas, Mohanty Jayashree

**Research design-** Bisoyi Diptiranjani, Khan Sahid Abdul, Puhan Ranjan Manas, Mohanty Jayashree

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