

COMPARISON OF EFFICACY AND POSTOPERATIVE COMPLICATIONS BETWEEN UNIPOLAR ELECTROCAUTERY AND BIPOLAR ELECTROCAUTERY IN CASES OF ANTERIOR EPISTAXIS: A RANDOMIZED CONTROL TRIAL

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ABSTRACT

Objective: To compare the efficacy and post-operative complications between unipolar electrocautery and bipolar electrocautery in cases of anterior epistaxis.

Methodology: Total 60 patients fulfilling the inclusion criteria were selected from ENT outpatient department of CMH Bahawalpur from January 2016 to June 2016. The randomly divided patients of Group A (n=30) underwent cauterization with unipolar cautery while Group B (n=30) patients with bipolar cautery. Both procedures were compared in terms of efficacy (no re-bleed) and complications (post-operative pain, infection and septal perforation).

Results: The mean age of the participants was 26.35 ± 13.3 years with 33 male and 27 female participants. No significant difference was noted in the post-operative bleeding after bipolar and unipolar procedure ($p=0.313$); showing both procedures to be equally effective. The groups were assessed for pain and infection on 1st and 5th postop day. Both the procedures had insignificant difference of pain on first postop day ($p=0.07$). However, there was significant difference of pain on 5th postop day ($p=0.023$). In Group A two cases developed postoperative infection compared to one case in Group B, but this difference between both procedures was not significant ($p=0.554$). There was no septal perforation in both groups.

Conclusion: Unipolar and bipolar cautery procedures are equally effective in controlling epistaxis with almost negligible postoperative infection. As far as postoperative pain is considered, bipolar cautery is less painful procedure than unipolar cautery.

Key Words: Anterior epistaxis, Bipolar electrocautery, Unipolar electrocautery

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INTRODUCTION

One of the most common Otorhinolaryngology emergency is epistaxis¹. Epistaxis is defined as the bleeding from inside of the nasal cavity. In severe case, the patients can even require hospital admission¹. These hospital admissions are only around 6% of the total epistaxis cases². Most commonly hospitalization is required in the refractory recurrent epistaxis in which surgical intervention is the only treatment option³.

Epistaxis is usually classified into two types, anterior and posterior epistaxis. This classification depends upon the site of nasal bleeding⁴. Most common type of epistaxis is anterior epistaxis where bleeding occurs from anterior part of nasal septum. Anterior epistaxis commonly arises from a plexus of blood vessels called

Kiesselbach's plexus which is an extensive vascular anastomosis along the anterior part of nasal septum⁵. Anterior epistaxis most commonly occurs in young adults and the children; on the other hand posterior epistaxis is seen mainly in the elderly patients⁴. Anterior epistaxis is mostly caused by nasal picking, infection, dryness, nasal trauma etc. Anterior epistaxis is not usually considered as a serious condition because of its relatively easy management i.e. applying local pressure, chemical or electrocautery or sometimes anterior nasal packing. On the other hand, posterior epistaxis management is considered difficult because of its approach⁴⁻⁵. Posterior nasal packing is difficult both for patient and physician alike.

Systemic and local factors both can cause epistaxis. Local causes include trauma, nasal septum or spur,

inflammation or infection, chemical exposure, climate changes or foreign bodies etc. Systemic cause may include hypertension, liver diseases, coagulopathies, renal diseases or even some anti-coagulant drugs etc.⁵⁻⁶. However, in majority of the patients (80-90%) the cause is unknown and it is termed as 'idiopathic'⁶. There are factors known to aggravate epistaxis, which include excessive coughing, nose blowing practices, straining in constipation and benign prostatic hyperplasia (BPH) and even heavy weight lifting⁷.

It is important in the management of epistaxis that the cause and bleeding site is identified. Once the site is established it is easy to stop bleeding and treat the underlying cause⁶⁻⁷. Some important methods of stopping the bleeding are: local pressure, nasal packing, topical vasoconstriction, cauterization and ligation, but there are no definitive protocols for epistaxis management⁷. Nasal cauterization is of two types, chemical cauterization and electric cauterization. Electric cauterization is either unipolar or bipolar cauterization. In unipolar cauterization, a single insulated electrode is used to cauterize however in bipolar electric current flows between the two prongs of the bipolar probe. There is no consensus on which type of cauterization is better or superior.

In this prospective study done in 60 patients, two different intervention techniques were compared for the management of anterior epistaxis. These two different techniques are unipolar electrocautery and bipolar electrocautery. The purpose of the study was to find the technique which is better, safer, more effective and has least complications. So that it has positive effect on better management of anterior epistaxis by health professionals benefitting patients of epistaxis.

METHODOLOGY

The study was carried out at Combined Military Hospital, Bahawalpur from January 1, 2016 to June 1, 2016. The sample size was calculated using Epitool software, keeping expected bleeding at 2% (taken from study conducted by Sciaran et al⁵ and Klotz et al⁷), desired precision at 0.05 and 95% confidence interval. The calculated sample size was 31 in each group. Researcher identified 72 cases of epistaxis for this study but 12 did not meet the inclusion criteria. Total of 60 patients fulfilling the inclusion criteria were selected from ENT outpatient department of CMH Bahawalpur after taking ethical approval from hospital administration and informed consent from the patients. Participants were randomly divided into two groups using random numbers table (30 cases in each group). Inclusion criteria were individuals of age more than 6 years with epistaxis from anterior nasal septum i.e. little's area. Exclusion criteria were individuals having bleeding disorder, liver and renal dysfunction (as bleeding disorders can affect

results); cases of nasal trauma; cases who had previous nasal surgery or cauterization; individuals on anti-clotting medications and cases with bilateral nasal bleeds were excluded.

Group A individuals were treated by cauterization with unipolar cautery. Group B individuals were treated by cauterization with bipolar cautery. Local anesthesia was given prior to the procedure. Local anesthesia used was 2% lignocaine with adrenaline. All the individuals were given similar treatment after the procedure. They were advised oral antibiotic, local vasoconstrictive nasal spray for one week and local antibiotic ointment for two weeks. Oral antibiotic prescribed was co-amoxiclav, vasoconstrictive nasal spray used was Xylometazoline and local antibiotic ointment prescribed was fucidic acid ointment. Both groups were compared in terms of efficacy and complications.

Efficacy was determined in terms of control of epistaxis i.e. whether the procedure was effective in controlling epistaxis or patient again developed bleeding and needed further treatment to control bleeding. Bleeding from same side of septum in nasal cavity was considered as re-bleeding and bleeding from opposite side was taken as a new nasal bleed. Patients were seen on first postop day, 5th postop day, after two weeks, one month and three months of procedure. Post-Operatively, patients were instructed to report to ENT department in case of any bleed which does not stop after 5 minutes of pinching nose with thumb and index finger of dominant hands.

Both procedures were also compared for complications i.e. post-operative pain and infection. Pain was categorized into mild, moderate and severe categories depending upon severity of pain using numeric rating scale for pain (NRS 0-10). Scores between 1-3 were considered as mild, 4-6 moderate and 7-10 as severe pain. Pain was checked on 1st postop day and 5th postop day. Post-operative infection was confirmed by the otorhinologist on follow-up visits. Infection was said to be present if the cauterized area had signs of infection including pus, redness and local tenderness. Septal perforation was seen on anterior rhinoscopy. All the cases were seen on first postop day, 5th postop day, after two week, after one month and three months of procedure. The assessment was done on basis of post-op bleeding, pain, infection and perforation.

Data had been analyzed using statistical package for social sciences (SPSS) version 20. Frequency and percentages were calculated for qualitative variables while mean and standard deviation (SD) were calculated for quantitative variable. Chi-square was used to compare qualitative variable between the two groups. A p value <0.05 was considered significant.

RESULTS

A total of 60 participants were included in the study of recurrent epistaxis, 30 in each group. The Mean age of the participants was 26.35 ± 13.3 years. Thirty-three participants were male and 27 were females. Both the groups were comparable with respect to gender ($p = 0.554$) and age ($p = 0.782$) as shown in tables 1 and 2.

They were operated and post-operative re-bleeding was assessed. There was only 1 case of post-operative bleed in bipolar procedure and no case of post-operative bleeding was noticed in unipolar procedure as shown in table 3. There was no significant difference in efficacy in both these procedures i.e. post-operative re-bleeding ($p = 0.313$).

As far as postop pain is considered, both groups were assessed for pain on first postop day and on 5th postop day. On first postop day, there were 11 cases of mild pain in Group A who underwent unipolar cautery

in comparison to Group B where we saw 18 cases of mild pain. Both the procedures had insignificant difference of pain on first postop day ($p=0.07$) as shown in table 4.

Similarly, on fifth postop day, there were 23 cases of mild pain in Group A who underwent unipolar cautery in comparison to Group B where we saw 29 cases of mild pain. Both the procedures had significant difference of pain on fifth postop day ($p=0.023$) as shown in table 5.

In Group A two cases developed postop infection. It was seen and confirmed by the otorhinolaryngologist. On the other hand, one case in Group B developed infection after bipolar cautery (table 6). But this difference between both procedures was insignificant ($p=0.554$). Postop infection was treated by the otorhinolaryngologist with help of further antibiotics till the resolution of symptoms and disease. There was no case of septal perforation in both groups.

Table 1: Gender distribution in both groups (n=60)

Groups	Gender		Total
	Male n (%)	Female n (%)	
Group A (Unipolar Cautery)	16 (53.3)	14 (46.6)	30
Group B (Bipolar Cautery)	17 (56.6)	13 (43.3)	30
Total	33	27	60

P =0.554

Table 2: Age distribution in both groups (n=60)

Groups	Mean	Std. Deviation
Group A (Unipolar Cautery)	25.17	13.388
Group B (Bipolar Cautery)	27.53	13.510
Total	26.35	13.388

P =0.782

Table 3: Post-operative re-bleeding (n=60)

Groups	Re-bleed		Total
	No Re-bleed n(%)	Re-bleed n(%)	
Group A (Unipolar Cautery)	30 (100)	0 (0%)	30
Group B (Bipolar Cautery)	29 (96.6)	1 (3.3)	30
Total	59	1	60

P =0.313

Table 4: Postop Pain on day 1 after procedure (n=60)

Groups	Pain			Total
	Mild n(%)	Moderate n(%)	Severe n(%)	
Group A (Unipolar Cautery)	11 (36.6)	19 (63.3)	0 (0.0)	30
Group B (Bipolar Cautery)	18 (60.0)	12 (40.0)	0 (0.0)	30
Total	29	31	0	60

P =0.07

Table 5: Postop pain on day 5 after procedure

Groups	Pain			Total
	Mild n(%)	Moderate n(%)	Severe n(%)	
Group A (Unipolar Cautery)	23 (76.6)	7 (23.3)	0 (0.0)	30
Group B (Bipolar Cautery)	29 (96.6)	1 (3.3)	0 (0.0)	30
Total	52	8	0	60

P =0.023

Table 6: Postop infection in both groups

Groups	Postop Infection		Total
	No infection n(%)	Infection n(%)	
Group A (Unipolar Cautery)	28 (93.3)	2 (6.6)	30
Group B (Bipolar Cautery)	29 (96.6)	1 (3.3)	30
Total	57	3	60

P =0.554

DISCUSSION

Epistaxis is commonly seen in everyday practice of ENT. Electrocautery is also routinely carried out for recurrent epistaxis. Both monopolar and bipolar cautery are performed by otorhinologists. It is usually performed under local anesthesia. The bleeding vessels get sealed because of radiation and thermal energy. In unipolar cautery, there is greater lateral thermal injury⁸. In bipolar technique, electric current flows between the two prongs of electrode thus avoid the lateral and deep thermal damage. However, electrocautery can damage anterior nares, inferior turbinates and surrounding area. This can be avoided by properly using aural speculum.

In every surgical procedure, its efficacy and complications are of utmost important. In present study, we observed that both techniques are equally effective in controlling epistaxis. In group B, there was only one case who developed re-bleeding, i.e. after the bipolar cautery procedure. Post-operative pain is also very

important aspect related to patients and the amount of postop analgesics required. Better is the procedure which has less postop pain. In our present study, we saw that there was no significant difference of postop pain on day 1 in both groups but on day 5 patients who had unipolar cautery had more pain than those who underwent bipolar cautery ($p=0.023$). It may be due to the increased lateral thermal damage caused by unipolar cautery⁸. Another benefit of bipolar cauterization is that it selectively cauterizes the bleeding area only as the size of burnt area is 0.5 mm as compared to 5 mm area in case of unipolar cautery⁹. There are many studies which have compared unipolar and bipolar methods in tonsillectomies but none has compared the two procedures in cases of anterior epistaxis. In tonsillectomies, many studies have shown bipolar tonsillectomy to be less painful procedure^{10,11}. However, few studies of tonsillectomies have on the other hand shown bipolar cauterization method to be more painful¹². In our case we saw that immediate postop pain is almost similar in the

two techniques but on 5th postop day pain is more in cases of unipolar cauterization.

In our study the frequency of postop infection was negligible and almost similar in both groups. In unipolar cautery group, two cases developed postop infection however in bipolar cautery group there was only one case who had postop infection. This difference was not significant ($p=0.554$). The infection of the cases settled with help of oral and local antibiotics. None of cases had postoperative perforation.

CONCLUSION

Unipolar and bipolar cautery procedures are equally effective in controlling epistaxis and are equally safe with almost negligible postop infection. As far as postop pain is considered, bipolar cautery is less painful than unipolar cautery procedure on fifth postop day but pain is almost similar in immediate postop period after both the procedures.

REFERENCES

1. Douglas R, Wormald PJ. Update on epistaxis. *Curr Opin Otolaryngol Head Neck Surg* 2007; 15:180-3.
2. Small M, Murray JA, Maran AG. A study of patients with epistaxis requiring admission to hospital. *Health Bull* 1982; 40:20-9.
3. McGarry G. Nosebleeds in children. *Clin Evid* 2006; 15:496-9.
4. Walker TW, Macfarlane TV, McGarry GW. Epidemiology and chronobiology of epistaxis: an investigation of Scottish hospital admissions 1995-2004. *Clin Otolaryngol* 2007; 32:361-5.
5. Ciaran SH, Owain H. Update on management of epistaxis. *West London Med J* 2009; 1:33-41.
6. Pallin DJ, Chng YM, McKay MP, Emond JA, Pelletier AJ, Camargo CA Jr. Epidemiology of epistaxis in US emergency departments, 1992 to 2001. *Ann Emerg Med* 2005; 46:77-81.
7. Klotz DA, Winkle MR, Richmon J, Hengerer AS. Surgical management of posterior epistaxis: a changing paradigm. *Laryngoscope* 2002; 112:1577-82.
8. *Sebiston Textbook of Surgery* 19th Ed. Elsevier Saunders; 2012.
9. Walker RA, Syed ZA. Harmonic scalpel tonsillectomy versus electrocautery tonsillectomy: a comparative pilot study. *Otolaryngol Head Neck Surg* 2001; 125:449-55.
10. Khan A, Sheikh ZA, Hameed MK. Bipolar versus unipolar diathermy for per-operative haemorrhage control during tonsillectomy. *J Islamabad Med Dent Council* 2013; 2:69-71.
11. Tay HL. Post-operative morbidity in electrodissection tonsillectomy. *J Laryngol Otol* 1995; 109:209-11.
12. Khan MA, Khan ZU, Akram S, Rafique U, Usman HB. Comparison of postoperative pain and hemorrhage in children after tonsilectomy with bipolar diathermy technique versus tonsillectomy with cold steel dissection and silk ligature. *Pak Armed Forces Med J* 2015; 65:739-42.

CONTRIBUTORS

MAK conceived the idea, planned the study, and drafted the manuscript. SA and MK helped acquisition of data and in manuscript writing. HBU did statistical analysis. All authors contributed significantly to the submitted manuscript.