Use of Propranolol for preparation of patients for Endoscopic Sinus Surgery

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Absrtact:

Introduction: Endoscopic sinus surgery is a frequent surgery that is usually done in most of ENT operative theaters; minimizing bleeding in the field of surgery during Endoscopic Sinus Surgery is very important key point of success of this surgery.

Aim of the Study: Is to determine the success of minimizing bleeding during Endoscopic Sinus Surgery by using Propranolol 40 mg orally one hour before surgery.

Patients and Methods: A randomized controlled single blind study of 2 groups of patients with chronic sinusitis that underwent endoscopic sinus surgery; one received Propranolol 40 mg oral tablet before surgery and other group did not.

Results: There was significant improvement of the surgical field and the bleeding was significantly lowered in the group of patients that received Propanolol before surgery; P value < 0.05

Conclusions: Use of Propranolol orally preoperatively is essential step in Endoscopic sinus surgery to improve surgical field by decreasing bleeding in patients in which they have no contraindications to Beta blockers.

Key worlds: Endoscopic Sinus Surgery, Beta blockers, bleeding, surgical field.

Introduction:

In the past two decades, there had been significant shift from external and head light sinus surgery to endoscopic sinus surgery(ESS)[1].This dramatic change was initiated by the pioneering studies of Messerklinger in which he demonstrated that each sinus has predetermined muciciliary clearance pattern draining toward its natural ostium irrespective of additional openings that may have been created into the sinuses[2].

Endoscopic sinus surgery is now accepted as a treatment of choice for chronic sinusitis[1]. The presence of significant bleeding in the surgical field is a critical factor in the potential success or failure of endoscopic sinus surgery[3]. When significant bleeding is present recognition of anatomical landmarks become difficult[4,5,6]. It is therefore critical to optimize the surgical field and in so doing make the surgical dissection as easy as is possible[4,5,6].

Aim of the Study:

Is to identify the success of use of oral 40 mg Propanolol orally one hour before surgery to improve the surgical field during endoscopic sinus surgery by decreasing bleeding inside the surgical field.

Patients and Methods:

Patients:

50 patients with chronic sinusitis not responding to medical treatment who underwent endoscopic sinus surgery in Al-Yarmouk teaching Hospital from the period of 25/January/2011 till 25/Fenruary/2012 were studied prospectively.

Patient included in the study are all 20-35 years old without any medical contraindication for hypotensive technique or contraindication to Propanolol and other beta blockers and all had the same indication of surgery which was chronic sinusitis not responding to medical treatment. Patients with nasal polyposis were excluded from the study.

Methods:

Preoperative:

All patients were given Intranasal corticosteroid spray (55 Microgram per dose, one dose each nostril 12 hourly) for 3 weeks, antibiotics (Amoxillin – Clavulanic acid 1000 mg capsule twice daily for one week prior to the operation; patients with allergy to penicillin had received clarithramycin 500 mg capsule twice daily for one week prior to the operation) and systemic corticosteroids (prednisolone tablets 30 mg per day for one week prior to the operation).

The patients included in the study ware divided randomly by simple method in to 2 groups

Group A: (25 patients) did not receive 40 mg Propranolol tablet.

Group B: (25 patients) received 40 mg Propranolol tablet one hour before introducing adrenalin nasal packing

Packing of the nasal cavity of with packs impregnated with 1: 50000 adrenalin done 10 minutes before induction of the general anesthesia.

Operative:

All patient were anesthetized with isoflurane inhalation; local infiltration of the axillary flap area of the middle turbinate and the anterior surface of the middle turbinate with 1:200000 adrenalin.

Postoperative:

All patients were observed for 24 hours in the hospital.

Grading system of bleeding during Endoscopic sinus surgery:

Boezaat and van der Merwe Grading[5]

Grade 1: Cadaveric conditions with minimal suction required.

Grade 2: Minimal bleeding with infrequent suction required.

Grade 3: Brisk bleeding with frequent suction required.

Grade 4: Bleeding covers surgical field after removal of suction before surgical instrument can perform maneuver.

Grade 5: Uncontrolled bleeding. Bleeding out of nostril on removal of suction.

Assessment of the grading of bleeding in our surgeries included in our study is usually done during first dissection step (after about one to one and a half hours from oral ingestion of Propanolol for Group B of patients included in our study) as we ask the patient to take the Propanolol 40 mg tablet with few amount of water orally then wait for one hour the packing for 10 minutes then the induction of anesthesia which takes about 10 minutes, then stage of adrenaline infiltration that takes about 10 minutes then dissection starts.

Result:

In our study 34 female and 16 male patients (the gender selected randomly as it has no effect on the study outcome); aged from 20 to 35 years old.

In Group A of patients the majority (12 out of 25 – 48%) were grade 3 bleeding and (10 out of 25 – 40%) were grade 4 and even (2 out of 25 -8%) were grade 5 which is uncontrollable bleeding in the surgical field; while only (1 out of 25 4%) was grade 2 as shown in table (1).

Table (1): grading of the bleeding in the surgical field according to Boezaat & van der Merwe for the patients in group A (those who did not receive Propanolol preoperatively)

Grade	Number of cases	%
Grade 1	0	0
Grade 2	1	4
Grade 3	12	48
Grade 4	10	40
Grade 5	2	8

In Group B of patients the majority (17 out of 25 – 68%) were Grade 2 bleeding and also we obtained best field Grade 1 in (2 out of 25 – 8%) of the patients; only (6 out of 25 – 24%) of the patients were grade 3 bleeding and no patient in grade 4 or 5 as shown in table (2).

Table (2): grading of the bleeding in the surgical field according to Boezaat & van der Merwe for the patients in group B (those who received Propranolol preoperatively)

Grade	Number of cases	%
Grade 1	2	8
Grade 2	17	68
Grade 3	6	24
Grade 4	0	0
Grade 5	0	0

Statistical analysis of our results using Chi square test showed significant difference between Group A and Group B; P value less than 0.05

Discussion:

Endoscopic Sinus surgery is the operation that require bloodless field to establish success; bleeding obscures surgical planes and make the identification of the drainage pathways of the sinuses difficult[1]. Many factors can increase or decrease bleeding during ESS

Anesthesia:

Halothane gives significant vasodilatation and should not be used[7]; it will result in relaxation of the pre-arteriolar muscle sphinters[7]. This produce significant peripheral vasodilatation and usually mild hypotension[5,6,7]. This peripheral hypotension with paralysis of the arteriolar and particularly sphincters can result in significant bleeding if surgery performed in the nose and sinuses[567]; for this reason all cases of ESS anesthetized with halothane were excluded from the study.

Isoflurane and sevoflurane produce less vasodilatation[7]; all patients in our study where maintained anesthetized using Isodlurane.

Total Intravenous Anesthesia (TIVA)-in the study of Wormald PJ. et. al.[8] in which randomized controlled single blinded study using TIVA(using propofol and remifentanyl constant intravenous infusion) and isoflurane; showed that the surgical fields ware better if TIVA is used[8].we did not used TIVA for our patients in our study because of unavailability of propofol and remifentanyl in out department.

Degree of inflammation of the Tissue under dissection:

Inflammation increase vascularity of the tissue[1], and when surgery is conducted on highly inflamed tissues, increased bleeding result. patients with sinusitis who have an infective complications requiring surgery will often have a very bloody surgical field[1].it is therefore stands to reason that using antibiotics preoperatively should improve the surgical field[1].All of the patient in our study had received antibiotics for one week prior to the operation.

Sieskiewicz A. et. al. [9] showed that 30 mg prednisolone daily was given for 5 days preoperatively and the result showed a significant improvement in the visual analogue grading of the surgical field during surgery, all of the patients in our study had received corticosteroids locally for 3 weeks and systematically for one week prior to the operation.

-nature of the tissue under dissection:

Polyps may bleed more aggressively on dissection than mucosa, for this reason patients

underwent ESS for sinonasal polyps ware excluded from the study.

After fixing of all above mentioned factors affecting state of bleeding in the surgical field we add 40 mg Propranolol tablet to half of our patients included in the study(group B) to identify the effects of the surgical field compared to the other half of patients not receiving this medication(group A); and there was a dramatic difference as for Group A there was only 4% in grade 2 and no patient in grade 1 while in Group B there was 74% in grade 1&2 (which is the ideal operable grades in ESS operation).

Nair S.[4] et. Al. showed in their double blind, placebo controlled, randomized prospective study that the patients who received the beta blocker (metaprolol) had a significantly lower pulse rate (mean of 59) than the placebo group (mean of 69) and the surgical field was usually good[4].these results support out finding in our study.

A.P. Mansur et. Al. showed in their study that the pharmacokinetic parameters obtained after perioral Propranolol administration were: peak plasma concentration (C_{MAX}): 41 ± 12 ng/ml; time to reach C_{MAX} (T_{MAX}): 52 ± 11 minutes; these finding certify that we start dissection at time of peek plasma concentration (C_{MAX}) of Propranolol after oral administration.

The Recently discovered Esmolol is a short acting cardioselective beta blocking agent that has a fast onset and short half life (around 3 minutes) and can be given by constant intravenous infusion during surgery so its effect can closely controlled[1].although this can be very worthwhile maneuver, it is very expensive drug[1].in our study we had use of the cheapest beta blocker available in the market (Propranolol) and with significant improvement of the bleeding in the surgical field, in our study 74% of the patients was in Grad 1 & 2 , the percentage can increase with availability of Total Intravenous Anesthesia (TIVA) and Esmolol in our operative theater.

Conclusion:

Use of Beta blockers in Endoscopic sinus surgery is very useful to decrease bleeding in the surgical field and reach a successful surgery and should be used routinely by our otolaryngologist during ESS if there are no contraindications to beta blockers.

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