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Original Article

Role of dexamethasone administration after septoplasty as comparative prospective audit

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Background and Objectives: ***Septoplasty is one of the most common surgical procedures in specialty of otorhinolaryngology. Therefore there are frequent thoughts regarding this procedure to improve its conditions from different aspects, indications, time of surgery, techniques, safety measures, and postoperative care. One of big issues regarding this procedure is the post-operative sequel and complications namely post-operative pain, oro-facial edema, , air way obstruction, epistaxis, nausea and vomiting, nasal obstruction, atrophic rhinitis, induction of allergic rhinitis, septal perforation and synachia formation. Therefore this study was conducted prospectively to confirm the effect of intravenous administration of dexamethasone on outcomes of this procedure as compared to the effect of oral administration of ketoprofen as well as paracetamol after septoplasty procedure.***

Patients and Methods: ***591 patients aged from 6 years to 65 years presented at ENT department –Althowra central teaching hospital as well as Altarahom private clinic – elbyda city – Libya at period in between September 2005 to January 2013 as cases of DNS with variable patterns of septal deformities for septoplasty. 147 patients were received oral paracetamol who represent group-A, 200 received oral ketoprofen that constitutes group-B, while remaining 244 were administrated by intravenous dexamethasone and classified as group-C. As prospective analytic study, three groups compared in relation to significant postoperative complications risk namely post-operative pain, oro-facial edema, , air way obstruction, epistaxis, nausea and vomiting, nasal obstruction, atrophic rhinitis, induction of allergic rhinitis, septal perforation and synachia formation. In addition these groups compared for any significant difference regarding the period of postoperative hospitalization which can be used as objective indicator to measure the postoperative morbidity rate.***

Results: ***Dexamethasone as well as ketoprofen administration caused significant improvement in pain intensity as compared to paracetamol group. On the other hand there was significant reduction in the incidence of post-operative oro-facial edema , air way obstruction, epistaxis, nausea and vomiting, nasal obstruction, atrophic rhinitis, induction of allergic rhinitis, septal perforation and synachia formation among group-B and C as compared to group-A.***

Conclusion: ***Generally speaking dexamethasone can be considered as potent analgesic drug after septoplasty procedure and in same time it plays significant role in the improvement of outcomes of this common procedure as compared to the other commonly used non-steroidal anti-inflammatory drugs.***

Keywords: ***Post-septoplasty analgesia, post- septoplasty dexamethasone administration.***

INTRODUCTION

Septoplasty is one of the most common surgical procedure in the specialty of otorhinolaryngology.[1,2] Post-operative pain is a significant problem that continues to be untreated. This pain can be in the form of facial pain, facial fullness, or un-tolerated headache.[1-3,5] In addition to the pain there are other significant post-septoplasty

problems, namely oro-facial edema, bleeding, air way obstruction, nausea and vomiting, pharyngitis, sore throat, dehydration, metabolic as well as nutritional deficiencies.[1-3,5] On the other hand there are other varieties of sequels which are considered as late complications namely nasal obstruction, atrophic rhinitis, induction of allergic rhinitis, septal perforation and synaechia formation.[1-3,5] Broadly speaking, and from the pathological point of view we can suggest that most of early complications after septoplasty can be correlated to the pain either in form of oro-facial pain, headache or throat pain. The oro-facial pain and edema, as well as local bleeding are mainly due to the local tissue trauma during the surgery itself. In accordance, the all edematous areas will heal later on by extensive fibrosis as the result of activation of fibroblasts leading to development of the late complications in form of atrophic changes, and synaechia formation as well-appreciated sequels of septoplasty procedure. From the other aspect, as the surgical nasal trauma is considered as one of well-established theories in pathogenesis of allergic rhinitis, the local mucosal trauma and enhancement of local inflammatory cells will result in the activation of local IgE–hypersensitivity reaction and subsequently the appearance of allergic rhinitis related symptoms and sings.[1-15]

For this reason there is continuous research for potent anti-inflammatory agent to be used post-operatively after septoplasty procedure. Although many studies have been carried out to evaluate the effect of diclofenac sodium as well as paracetamol and indomethacin on post-septoplasty pain,[1-15] it was felt at the time of initiating this study that there is a lack of data and information regarding the effectiveness of intravenous administration of dexamethasone after septoplasty. The specific aims of this presenting study were (a): To assess the anti-inflammatory efficacy of dexamethasone on post-septoplasty early complication. (b): To compare the anti-inflammatory efficacy of dexamethasone with that of ketoprufen and paracetamol as most common NSAID drugs used after this surgery. (c): To postulate the effect of intravenous administration of dexamethasone on late outcomes of septoplasty procedure as compared to ketoprufen and paracetamol.

PATIENTS AND METHODS

591 patients aged from 6 years to 65 years presented at ENT department- Althowra central teaching hospital as well as Altarahom private clinic – Albyda city – Libya at period in between September 2005 to January 2013 as cases of DNS with variable patterns of septal deformities for septoplasty. Patients with renal disease, gastro-intestinal disease, chronic pain states or daily intake of NSAID were excluded. Informed consent was obtained from all adult patients as well as from patients' parents for the children. All patients were admitted 6 to 24 hours prior to surgery after normal routine investigations. The patients were divided into three groups on random distribution basis, each group contains variety of ages from selected age spectrum.147 patients were received oral paracetamol (10-15 mg/kg) in four divided doses first dose after two hours from surgery, those represent group-A, 200 received oral ketoprufen (1-3 mg/kg) in three divided doses, first dose at the end of surgery before wake-up from anesthesia, with the second dose eight hours postoperatively, those constitute group-B, while remaining 244 were administrated by intravenous dexamethasone (4-8mg\ dose) as three doses first dose was administrated intra-operatively, and this group was classified as group-C.

Inhalation anesthesia with Halothane was used and supplemented with intravenous Fentanyl 200-400mg, and intubation was performed by oral endotracheal tube insertion.

septoplasty was carried out via the hemi-transfixion incision, followed by elevation of muco-perichondrial as well as mucoperiosteal flaps, the both superior and inferior tunnels prepared, and then the septal cartilage and\or vomer bone was separated then subsequently corrected. Sometimes the maxillary crest removed through the inferior tunnel. All patients underwent extubation in the operative room then transferred to the recovery station, vital signs were assessed and after appropriate care in recovery room the patients were transferred to the in patient ward. During this interval; any instances of crying, shouting, vomiting or agitation were recorded. The patients were assessed 6, 12, 18 and 24 hours after surgery to see whether they required anti-nociception medication. The pain was assessed subjectively by direct asking of patient as well as observation of facial expression of the patient during swallowing process. Time of first oral intake and quantity was recorded; temperature, nausea and vomiting were also recorded. Although there were some cases attained some degree of improvement in pain after administration of analgesic drug, they were considered as having pain, while those who improved completely were considered as having no pain. As prospective analytic study, three groups compared in relation to significant postoperative complications risk namely post-operative pain, oro-facial edema, air way obstruction, nasal bleeding, nausea and vomiting, nasal obstruction, and occasionally all patients followed for six weeks postoperatively to be assessed for any evidences of post-septoplasty atrophic rhinitis, induction of allergic rhinitis, and synachia formation. In addition these groups compared for any significant difference regarding the period of postoperative hospitalization which can be used as objective indicator to measure the postoperative morbidity rate.

Data were expressed by using descriptive analysis as means ±, standard error of mean (s.e.m) and percentages. Test of significance was carried out; using chi-square test and two-way analysis of variance ~.A probability less than 0.05 was considered as significant, the degree of significance was determined by using level of standard deviation test. Student—t—test was used for dependent sample, as well as contingency coefficient was calculated as measurement of association between nominal variables.

RESULTS

The results presented significant reduction in post-septoplasty pain after administration of dexamethasone as well as ketoprufen in comparison to paracetamol (P<0.01), Therefore the amount of ingested fluids was increased significantly by administration of dexamethasone as well as ketoprufen (P<0.01) as compared to paracetamol. There was significant reduction in the incidence of post-operative vomiting tendency by administration of dexamethasone as well as ketoprufen as compared to paracetamol (P<0.05).

On the other hand this study showed significant decrease in the risk of post-septoplasty nasal bleeding after administration of dexamethasone as compared to ketoprufen as well as paracetamol (P<0.1). Occasionally there was significant difference between the studied groups regarding the incidence of post-septoplasty dehydration; the hydration status was significantly improved after administration of dexamethasone as well as ketoprufen as compared to paracetamol (P< 0.01).

On the other hand, there was significant difference regarding the incidence of the post-septoplasty atrophic rhinitis, synaechia, and allergic rhinitis. The incidence of these three sequels was significantly reduced after administration of dexamethasone as compared to ketoprufen and paracetamol (P< 0.05).

In fact there was no any significant difference between three groups regarding the occurrence of post-septoplasty air way obstruction (P>0.5) i.e. there was no any post-operative air way obstruction cases recorded by this presented study. By same manner, there was no any significant difference between three groups regarding the appearance of post-septoplasty metabolic or nutritional deficiencies (P>0.5). In addition, there was no any significant difference between three groups in relation to post-operative hospitalization time, all patients among three groups were discharged from the hospital after 12 hours maximum from time of the surgery performance (P>0.5).

Table I. Relationship between type of anti-nociceptive drug and postoperative pain (throat pain, facial pain, & headache) (P < 0.01).

	Type of anti-nociceptive agent						
	Dexamethasone		ketoprufen		Paracetamol		
	N	Percentage %	N	Percentage %	N	Percentage %	Total
Have no pain	200	082	160	080	94	064	454
Have pain	44	018	40	020	53	036	137
Total	244	100	200	100	147	100	591

Table II. Relationship between type of anti-nociceptive drug and postoperative vomiting tendency (P < 0.01).

	Type of anti-nociceptive agent						
	Dexamethasone		ketoprufen		Paracetamol		
	N	Percentage %	N	Percentage %	N	Percentage %	Total
Yes	27	011	38	019	48	033	113
No	217	089	162	081	99	067	478
Total	244	100	200	100	147	100	591

Table III. Relationship between type of anti-nociceptive drug and postoperative epistaxis risk (P < 0.01).

	Type of anti-nociceptive agent						
	Dexamethasone		ketoprufen		Paracetamol		
	N	Percentage %	N	Percentage %	N	Percentage %	Total
Bleeding	2	0.8	11	006	9	006	22
No bleeding	242	99.2	189	094	138	094	569
Total	244	100	200	100	147	100	591

Table IV. Relationship between type of anti-nociceptive drug and postoperative dehydration (P < 0.01).

	Type of anti-nociceptive agent						
	Dexamethasone		ketoprufen		Paracetamol		
	N	Percentage %	N	Percentage %	N	Percentage %	Total
Yes	4	1.6	13	6.5	22	015	39
No	240	98.4	187	93.5	125	085	552
Total	244	100	200	100	147	100	591

Table V. Relationship between type of anti-nociceptive drug and postoperative hospitalization time (P >0.5).

	Type of anti-nociceptive agent						
	Dexamethasone		ketoprufen		Paracetamol		
	N	Percentage %	N	Percentage %	N	Percentage %	Total
<24 hour	244	100	200	100	147	100	591
>24 hour	00	000	00	000	00	000	000
Total	244	100	200	100	147	100	591

Table VI. Relationship between type of anti-nociceptive drug and postoperative atrophic rhinitis (P < 0.05).

	Type of anti-nociceptive agent						
	Dexamethasone		ketoprufen		Paracetamol		
	N	Percentage %	N	Percentage %	N	Percentage %	Total
Yes	2	0.8	5	2.5	12	008	19
No	242	99.2	195	97.5	135	92	572
Total	244	100	200	100	147	100	591

Table VII. Relationship between type of anti-nociceptive drug and postoperative allergic rhinitis (P < 0.05).

	Type of anti-nociceptive agent						
	Dexamethasone		ketoprufen		Paracetamol		
	N	Percentage %	N	Percentage %	N	Percentage %	Total
Yes	00	00	3	080	7	064	10
No	244	100	197	020	140	036	581
Total	244	100	200	100	147	100	591

Table VIII. Relationship between type of anti-nociceptive drug and postoperative synaechia (P < 0.05).

	Type of anti-nociceptive agent						
	Dexamethasone		ketoprufen		Paracetamol		
	N	Percentage %	N	Percentage %	N	Percentage %	Total
Yes	00	00	3	001	4	2.8	6
No	244	100	198	099	143	97.2	585
Total	244	100	200	100	147	100	591

DISCUSSION

Septoplasty is one of most common surgical procedure in the specialty of (ENT). Post-operative pain is a significant problem that continues to be untreated, which leads to the inability to tolerate oral intake and unplanned hospitalization.[1-3, 5]

Prostaglandins contribute to pain and inflammation after tissue injury and the anti-nociceptive action of NSAID Drugs is attributed usually to the peripheral inhibition of prostaglandin synthesis.[1-17]

It has been demonstrated that the administration of diclofenac sodium decreases postoperative pain results in a lower incidence of nausea and vomiting, and increases oral intake as compared to paracetamol.[3,5,7] In the same studies; it has been shown that by the administration of diclofenac sodium still there is risk of post-septoplasty complications particularly the bleeding, this is most probably due to platelets dysfunction which may be caused by the administration of diclofenac sodium.[3,5,7,8]

On the other hand; it was found that ketoprufen given (1-3mg/kg) in three divided doses after septoplasty decreases pain, increases liquid intake in the first 24 hours and resulted in earlier discharge from hospital as compared to paracetamol. Although ketoprufen was given earlier with less frequency, but still it is showing more potent analgesic effect as compared to paracetamol. This can be explained by longer duration of action of ketoprufen as compared to paracetamol.[1-10]

In addition it was found that the intra-operative as well as postoperative intravenous administration of dexamethasone will help in the maintenance of air way as patent as much as possible due to the potent anti-inflammatory action of this agent. In same manner the systemic administration of dexamethasone was approved to relief the post-septoplasty throat pain thus it helps in the recovery of normal swallowing mechanism as soon as possible, and due to platelets aggregation stimulating effect of dexamethasone, its systemic administration was found to reduce the risk of post-septoplasty hemorrhage.[19-23] The protocol of dexamethasone administration which applied in this presenting study was 4-8mgs administered intravenously at time of anesthesia induction then followed by 4-8mgs administered intravenously every eight hours postoperatively for first 24 hours and after that the patient will continue with oral administration of dexamethasone as 1 mg \ kg \ day for 7-14 days accordingly.[16-25]

Although there were multiple factors which usually affect severity of pain and tolerance of the patient to pain intensity, one of them is the age factor. The adult ages can tolerate pain more than children. Other factor is the technique of the surgery whether there is a lot of cartilage and bone manipulations or no.[2,8] But the effects of these factors on the results of the study were overcame by random selection of the patients involved in each group, and each group was including all age varieties in the presenting study. Also the random distribution of patients in each group was made regarding the technique which was used intra-operatively for septal correction.

On the other hand, the vomiting tendency can be correlated with the pain intensity, that the pain severity is directly proportionate to the induction of vomiting tendency.[4,6,9,11-18] This can be explained by the relationship between the pain and vasovagal attack i.e. the pain is an important inducing factor of vasovagal attack, thus the stimulation of vasovagal attack will induce vomiting.[4,6,9,11-18] This may explain the significant reduction of vomiting tendency after administration of dexamethasone as well as ketoprufen as compared to paracetamol.

Regarding the incidence of late complications namely atrophic rhinitis, synaechia as well as allergic rhinitis, as it can be noted from the results at this study, the incidence of these three sequels was significantly reduced after administration of dexamethasone as compared to ketoprufen and paracetamol, this is simply can be explained by the potent anti-inflammatory effect of the steroids as compared to NSAID. Therefore the administration of the dexamethasone will inhibit the secretion of local inflammatory mediators which act to stimulate the activity of fibroblasts for further fibrosis and by this action the incidence of post-operative atrophic rhinitis and synaechia formation will be reduced. On the other hand, the administration of dexamethasone will inhibit macrophages as well as T-lymphocytes inflammatory mediators secretions thus no IgE antibodies will be formed and subsequently the incidence of post-septoplasty allergic rhinitis will be reduced.[1-10,13-21]

As the septoplasty is one of common procedure in ENT specialty thus continuous researches are recommended to resolve all problems which can be associated with it.

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