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Pain Reducing Effect Of Parenteral Paracetamol and Diclofenac After Septoplasty

Parenteral Parasetamol ve Diklofenakın Septoplasti Sonrası Ağrı Kesici Etkisi

ABSTRACT

Objective: Intravenous (IV) paracetamol (acetaminophen) is an analgesic and antipyretic medication that can be used for reduction of postoperative pain. In this study, we compared the efficacies of IV paracetamol and intramuscular (IM) diclofenac on postoperative pain following septoplasty.

Material and Method: In this study, 27 of 54 patients who had septoplasty were administered IV 1 gr paracetamol with six hours intervals (q.i.d.) after surgery while the other 27 patients received 75 mg diclofenac IM with 12 hours intervals (b.i.d.). Vital signs, electrocardiogram, and blood chemistry were obtained prior to administration of drugs and 24 hours postoperatively for detection of any possible side effects.

Results: Both preparations were equally effective for controlling postoperative pain. There were no side effects in any of the groups. Statistical analysis did not reveal any difference between the groups ($P > 0.05$).

Conclusion: Although there were no statistically significant differences between IV paracetamol and IM diclofenac for reduction of the postoperative pain, more frequent administration of paracetamol and 15 minute of infusion caused problems in early mobilization of patients when compared to diclofenac group. Total cost of the therapy was also in favor of diclofenac. Diclofenac was also cost-effective.

Key words: Acetaminophen, Diclofenac, Pain, Postoperative

ÖZET

Amaç: IV acetaminophen (paracetamol) post-operatif olarak kullanılabilen analjezik ve antipiretik etkili bir preparattır. Bu çalışmada intravenöz parasetamolün ve intramüsküler olarak kullanılan diklofenak'ın postoperatif ağrılardaki etkinlikleri karşılaştırıldı.

Materyal ve Metod: Bu çalışmada toplam 54 hastanın 27'sine 6 saat arayla 1gr IV paracetamol, 27'sine ise 12 saatte bir IM olarak diklofenak verildi. İlaç uygulamasından önce ve operasyondan 24 saat sonra oluşabilecek yan etkiler; vital bulgular, elektrokardiyografik (EKG) ve biyokimyasal olarak kontrol edildi.

Bulgular: Her iki preparat da postoperatif ağrı kontrolünde oldukça etkiliydi. Gruplarda herhangi bir yan etki gözlenmedi. İstatistik analizler sonucunda gruplar arasında anlamlı bir fark görülmedi.

Sonuç: İntravenöz uygulanan 1g paracetamol ile intramüsküler olarak uygulanan 75mg diklofenak arasında post operatif olarak ağrıyı azaltmadaki etkilerinde istatistiksel olarak anlamlı fark olmamasına rağmen parasetamolün her 6 saatte bir uygulanması ve uygulama sürecinin 15 dakika olması diklofenak grubu hastalarına göre erken mobilizasyonda sorun teşkil etmiştir. Ayrıca total maliyet hesaplandığında diklofenacın kulak burun boğaz ameliyatlarından sonra daha çok tercih edilebileceği düşünülmüştür.

Anahtar kelimeler: Parasetamol, Diklofenak, Postoperatif ağrı

INTRODUCTION

Pain is a frequent symptom following nasal surgery and it must be managed effectively. The short time useage of analgesics provides adequate pain control following some operations, however, in some other surgeries the need for analgesics may be longer (1).

Septoplasty is a frequent operation in otorhinolaryngology practice. It can be

performed under local anesthesia and the patient is usually discharged on the day of the surgery. However, postoperative pain may interfere with normal daily activity. Although the intensity of postoperative pain had been decreased by the development of anesthesia and surgical techniques, pain is still an important postoperative problem (2-4). There is no consensus on the analgesics that must be used in the postoperative period and how they will be used. However, the pain must be managed effectively for early mobilization of the patient both during the hospitalization period and following discharge from hospital (5).

Opioids are commonly used in both perioperative and postoperative periods in otorhinolaryngologic surgery. Nausea, vomiting, dizziness, sedation and respiratory depression are dose-related side effects of opioids (6). Selective COX-2 inhibitors and other non-steroid anti-inflammatory agents (NSAIDs) are frequently preferred owing to their ability to reduce postoperative pain and inflammation (1). Paracetamol supplies effective analgesia when used alone or combined with other analgesics. It is a non-opioid analgesic that is frequently used in patients with asthma and aspirin intolerance, and it is quite effective in moderate and moderate-severe pain (7). Additionally, gastrointestinal, hematologic, renal and cardiovascular side effects of NSAIDs as well as vomiting and respiratory depression seen with the use of opioids are less frequent with paracetamol (8).

Intravenous use of paracetamol is difficult because it does not dissolve well in water. Propacetamol, a water soluble form of paracetamol, has been developed for this purpose, and is used in post-operative patients (9). It may be preferred against diclofenac sodium owing to its fewer side effects and the safety profile.

Intravenous (IV) paracetamol is widely used in many countries. Studies and data concerning this medication are few in number and new studies are needed. Recently, a new preparation of IV paracetamol has been developed as 1 gr/100 ml paracetamol (Perfalgan®; Bristol Myers-Squibb) that pharmacokinetically equals to 2 gr of propacetamol, and is shown to be tolerated better in the injection site (10,11).

In this study, we compared IV paracetamol and intramuscular (IM) diclofenac sodium for their analgesic efficacies, side effects, ease of administration and the comfort of patient following septoplasty.

METHODS

This study is performed in Otorhinolaryngology Clinic of Dr.Abdurrahman Yurtarlan Oncology Education and Research Hospital, Ankara, Turkey. Fifty four patients that had septoplasty (33 males and 21 females) were included in the study. Permission for the study was given by The Institutional Ethics Committee.

Any psychiatric problems, pregnancy, alcoholism, use of drugs, gastrointestinal disorders, respiratory and cardiac diseases and bleeding diatheses were questioned before surgery. Patients were also questioned for paracetamol, fenacetin, diclofenac, NSAID or aspirin hypersensitivities. Liver and renal functions were analyzed by blood chemistry.

Age and gender of the patients are presented in Table 1.

All patients had IV midazolam 0.01mg/kg and fentanyl 1mg/kg for sedation, and local infiltration anesthesia was applied. All patients were monitored for their arterial blood pressure, electrocardiogram and pulse oxymetry during septoplasty.

Twenty seven patients in the paracetamol group, 20 males and 7 females, were administered 1 vial (1gr/100 ml) "Perfalgan®" which is the ready to use injectable form of paracetamol as an IV infusion, in 15 minutes. The time of the first dose was pointed out as the time "zero". The dose was repeated every six hours including the 24th hour.

Other 27 patients (13 males and 14 females) were administered 75 mg diclofenac sodium IM right after septoplasty, and the medication was repeated every 12 hours including the 24th hour.

Postoperatively all patients were monitored for the vital signs (heart rate, body temperature, arterial blood pressure, respiration) and infusion / injection sites were also inspected every two hours. Routine blood tests including liver and renal function tests were repeated on postoperative 48th hour.

The level of pain was scored on a 5 point scale; 0 indicating no pain and 5 indicating the worst pain ever. Each point was represented by a face drawing, 0 had the happiest face while the point 5 had the saddest face. The pain scoring started from the point "zero", the time when the first medication was administered (12). Then the patient scored his/her pain at first postoperative hour followed by two hours intervals.

For statistical analysis, Shapiro-Wilk test was used to test the normality of the distribution of the variables. The distributions were not normal and group variances were not homogeneous according to Levene's test. So, the differences between male and

female groups, diclofenac and paracetamol groups were analyzed by Mann-Whitney U test. Comparisons of the time periods were done by Friedman test and then multiple comparisons between pairs of groups were carried out according to Dunn test. Results have been expressed as number of observations (n), mean ± Standard deviation, median and min-max values. P value less than 0.05 was considered significant. All statistical analyses were performed with the SPSS software (Statistical Package for the Social Sciences, V:13.0, SPSS Inc, Chicago, IL, USA) (Table 2).

RESULTS

Both paracetamol and diclofenac were tolerated well. There were no side effects that needed to interrupt the therapy in any of the patients.

Pain scores were lower in the diclofenac group in all

postoperative hours, however the difference between the groups was not statistically significant ($P > 0.05$) (Figure 1). The pain scores were high until postoperative 3rd hour in both groups, and then reduced progressively (Figure 1).

There was no difference between males and females for pain scores in both groups (Table 2, Figure 2). The pain score was higher in the paracetamol group in both females and males compared to diclofenac group (Figure 2) although the difference was not statistically significant.

Following therapy, there were no pathological alterations in cardiologic, renal or hepatic data in any of the patients. There were no side effects related to analgesic therapy in any of the patients.

DISCUSSION

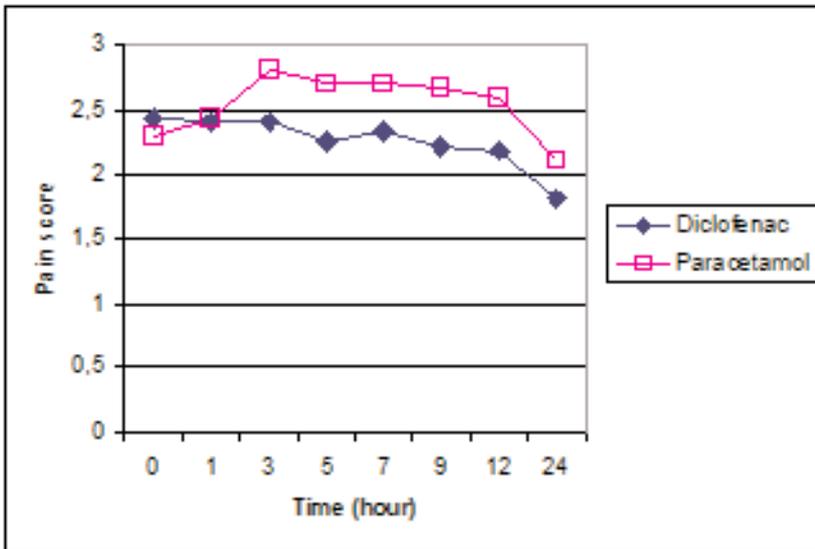


Figure 1: Postoperative 24-hour pain scores in paracetamol and diclofenac groups.

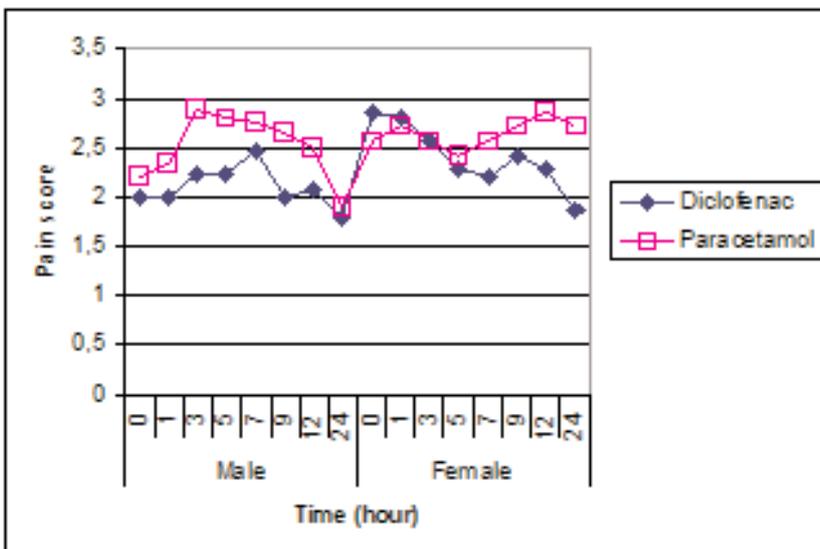


Figure 2: 24-hour pain score in males and females in paracetamol and diclofenac groups.

	PARACETAMOL	DICLOFENAC
Number of patients	27	27
Gender (male/female)	20 / 7	13 / 14
Mean age of males/mean age of females (years)	32.9 / 22.57	30.08 / 27.29

Table 1: Gender and ages of the patients in paracetamol and diclofenac groups.

		Male	Female	p
		M, (min-max)	M, (min-max)	
Diclofenac (n _{male} =13, n _{female} =14)	0	30.08±8.20	27.29±9.65	0.169
		30.00 (19.00-44.00)	24.50 (18.00-47.00)	
	1	2.00 ± 0.71	2.86 ± 1.51	0.094
		2.00 (1.00-3.00)	3.00(1.00-5.00)	
	3	2.00 ± 0.82	2.79 ± 1.19	0.458
		2.00 (1.00-3.00)	3.00 (1.00-5.00)	
	5	2.23 ± 0.83)	2.57 ± 0.94	0.905
		2.00 (1.00-4.00)	2.00 (2.00-5.00)	
	7	2.23 ± 0.93	2.28 ± 0.82	0.519
		2.00 (1.00-4.00)	2.00 (1.00-4.00)	
	9	2.46 ± 0.97	2.21 ± 1.05	0.519
		2.00 (1.00-4.00)	2.00 (1.00-4.00)	
	12	2.00 ± 0.58	2.42 ± 1.34	0.756
		2.00 (1.00-3.00)	2.50 (1.00-5.00)	
	24	2.08 ± 0.95	2.29 ± 1.20	0.756
		2.00 (1.00-5.00)	2.00 (1.00-4.00)	
Paracetamol (n _{male} =20, n _{female} =7)	0	32.90 ± 10.12	22.57 ± 6.24	0.464
		33.50(18.00-52.00)	19 (19.00-36.00)	
	1	2.20 ± 1.10	2.57 ± 1.13	0.400
		2.00 (1.00-4.00)	3.00 (1.00-4.00)	
	3	2.35 ± 0.93	2.71 ± 1.11	0.533
		2.00 (1.00-5.00)	3.00(1.00-4.00)	
	5	2.90 ± 1.12	2.57 ± 0.97	0.498
		3.00(1.00-5.00)	3.00 (1.00-4.00)	
	7	2.80 ± 0.83	2.42 ± 1.13	0.893
		3.00 (1.00-4.00)	3.00 (1.00-4.00)	
	9	2.75±1.21	2.57±0.97	0.978
		2.00 (1.00-5.00)	3.00(1.00-4.00)	
	12	2.65±0.93	2.71 ± 1.49	0.607
		2.00 (1.00-4.00)	3.00 (1.00-5.00)	
	24	2.50 ± 0.95	2.86 ± 1.34	0.179
		2.5 (1.00-4.00)	3.00 (1.00-5.00)	
		1.90 ± 0.91	2.71 ± 1.38	
		2.00 (1.00-4.00)	2.00(1.00-5.00)	

Table 2: There was no statistical difference between males and females for postoperative pain scores in paracetamol or diclofenac group

To our knowledge, IV paracetamol has not been compared with another analgesic for postoperative pain following septoplasty. In this study we have compared IV paracetamol and IM diclofenac sodium, and have shown that they were similar for controlling postoperative pain following septoplasty. Paracetamol is a NSAID mostly used as an analgesic. Its anti-inflammatory effect is not pronounced (10). It shows its effect by inhibiting prostaglandin synthesis in central nervous system. It can cause inhibition of platelet functions, peri-operative hemorrhage and nephrotoxicity with or without renal insufficiency following its use for postoperative analgesia after dental surgery (8). Sinatra et al. have used paracetamol after orthopedic surgery and stated that its risk for dose-related hepatotoxicity was high especially in newborns and children when used in high doses (11).

Intravenous use of paracetamol results in higher serum concentrations and fewer side effects when compared to its oral use. That is why its IV use may be preferred (12). We have preferred to use paracetamol intravenously. Wall and Dahl and Kehlet reported that the effective dose for paracetamol was 15 mg/kg/day (12).

Some studies have focused on analgesic and anti-inflammatory effects of NSAIDs. Kemppainen et al. used placebo or paracetamol after endoscopic sinus surgery (13). They reported that 27 of 38 patients that used placebo (71%) versus only 9 of 36 patients (25%) that used paracetamol needed a rescue analgesic, and there was no difference between groups for the side effects. In our study, none of the patients needed an additional analgesic and this condition is concordant to literature.

Baer et al. shared the same opinion with a number of authors and stated that duration of analgesic effect of paracetamol was considerably shorter when compared to diclofenac and other NSAIDs (14). They also stated that intramuscular administration of diclofenac 75 mg every 12 hours was adequate, however, 1-2 gr of paracetamol should be administered every 6 hours for pain relief. In our study, we administered 75 mg diclofenac every 12 hours intramuscularly whereas our schedule for administration of paracetamol was 1 gr IV every 6 hours. The need for frequent administration of paracetamol caused a difficulty in treatment and impaired mobilization of the patient. Patients in the diclofenac group could mobilize in a shorter while the patients in the paracetamol group had to spend more time in their bed.

In a recent study Atef and Fawaz used IV paracetamol

for postoperative analgesia following tonsillectomy and found that it provided a rapid and effective analgesia in moderate-severe pain (13). Intravenous paracetamol was tolerated well in our study, however it moderately different from diclofenac in reducing postoperative pain (Figures 1, 2).

Lingren and Djupso and Alexander et al. reported that analgesic efficacy of paracetamol was similar to diclofenac for postoperative pain control in orthopedic patients (16,17). Similarly, many clinical trials have shown that analgesic efficacy of paracetamol in postoperative pain was similar to other NSAIDs and COX-2 inhibitors (18, 19).

According to Wright, selective COX-2 inhibitors can cause hypertension due to retention of salt and water in body (20). In our study we did not find hypertension in any of our patients. Brater has shown that paracetamol and especially COX-2 inhibitors exert a minimal effect on renal functions (21). Murphy reported that paracetamol could be a safe drug in management of acute pain owing to its minimal side effects on renal functions (22). In our study, we performed blood chemistry to monitor both renal and liver functions before and after surgery and did not find any side effects related to renal or hepatic functions in paracetamol or diclofenac groups.

Munsterhjelm et al. stated that paracetamol inhibited prostaglandin synthesis in central nervous system and its inhibitory effect on platelet functions was weak (23). We did not encounter any alteration in the platelet count in paracetamol group 48 hours after the operation. According to Sheen et al. paracetamol hepatotoxicity was more common following overdose (24). We did not observe and rise in hepatic enzymes when compared to preoperative levels.

CONCLUSION

IV paracetamol and IM diclofenac sodium are effective similarly in postoperative analgesia following septoplasty. The need for repeating the dose of IV paracetamol every six hours affected the mobilization of the patients negatively. In the light of our data, we concluded that although IV paracetamol and IM diclofenac did not have any statistically significant difference in postoperative analgesia following septoplasty, paracetamol was a safe drug concerning renal, hepatic and gastric functions, diclofenac allowed early mobilization of the patients more than paracetamol and hence returning to normal daily activities is earlier and had a lower cost. Shortly both agents may be chosen for postoperative analgesia following septoplasty.

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