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Research Article

Intravenous Parecoxib Versus Intravenous Tramadol for Post Operative Pain Control After Elective Caesarean Section

Zarni Su[1], Kyaw Shwe[2]

[1]Department of Obstetrics and Gynaecology, University of Medicine 1, Yangon, Myanmar

[2]Department of Obstetrics and Gynaecology, University of Medicine 1, Yangon, Myanmar

[*]**Corresponding author:** Zarni Su, Luton and Dunstable Hospital, Luton, UK, LU4 0DZ

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Abstract

Objective: To study the efficacy of intravenous parecoxib versus intravenous tramadol for post-operative pain control after elective caesarean section. Main objectives of this study were to compare the pain scores at 2, 4, 6 and 12 hours after elective caesarean section, to describe the side effects of parecoxib and tramadol, and to find out the rescue analgesic ketorolac injection requirement in both groups. **Study design:** This hospital based randomised comparative study was conducted at Central Women Hospital (Yangon) between January 2018 and December 2018. A total of 80 women who underwent elective caesarean section after selection by inclusion and exclusion criteria were included. **Results:** In parecoxib group, mean Visual Analogue Scale (VAS) at 2,4,6 and 12 hours follow-ups were 0.9, 1.72, 4.15 and 4.78 respectively. Mean VAS of tramadol were 1.05 at 2 hour, 1.9 at 4 hour, 4.68 at 6 hour and 4.55 at 12 hour follow-up. According to 12 hour follow-up data, patients who experienced intolerable pain were 77.5% (n=31) in the parecoxib group and 70% (n=28) in the tramadol group. According to side effects profile of both drugs, no patients suffered nausea, drowsiness, headache in parecoxib group. Only 5% (n=2) complained of vomiting. In tramadol group, 20%, 7.5%, 20% and 17.5% of patients suffered nausea, vomiting, drowsiness and headache respectively. Rescue analgesics, injection ketorolac, were required in 10% of parecoxib group and 20% of tramadol group. **Conclusion:** Both drugs are effective analgesics for post operative pain. Parecoxib has slightly better analgesic efficacy and lesser side effects than that of tramadol. Parecoxib can be used for post operative pain management after elective caesarean delivery thereby reducing opioid related side effects.

Keywords: Parecoxib, Tramadol, post-operative pain, caesarean section, opioid, Visual Analogue Scale

Introduction

Caesarean section is a common obstetrics procedure worldwide. A majority of patients experience moderate to severe pain after surgery. Adequate pain control after caesarean section is required for early mobilization of mother and to take care of her newborn as early as possible. An ideal method for pain relief after caesarean delivery should be cost effective, safe for mother, require minimal monitoring and use drugs that are not secreted into breast milk. Moreover, the mother should not be sedated or disturbed by equipment that prevents her from moving freely and caring for the newborn. Minor less effects such as nausea, vomiting and pruritus may lead to less maternal satisfaction. Drug availability, maternal health conditions, patient preferences, availability of medical expertise and trained support staff also play a role in choice of analgesic method. Opioids, such as morphine and derivatives are commonly used for pain control after caesarean section because of their effectiveness and safety for breastfeed baby [1]. They are effective in controlling post operative pain. As their action is mainly on central nervous system, opioids produce many adverse effects including pruritus, nausea, vomiting, ileus, constipation, sedation, and respiratory depression.

Non-steroidal inflammatory drugs (NSAIDS) are recommended for their effectiveness in reducing post operative pain. They also reduce opioid-related adverse effects, improve quality of recovery, and decrease length of stay. Therefore, parental NSAIDS for pain control after caesarean section have been of great interest. One study compared the analgesic efficacy of tramadol and paracetamol for post operative pain after caesarean section. It showed that both tramadol and paracetamol achieved satisfactory pain control after operation, but tramadol caused significant side effects in mother compared to paracetamol [2]. After studying of 60 women who underwent lower abdominal surgery, it was concluded that intravenous parecoxib (20 or 40 mg) was effective in decreasing the PCA opioid requirement after lower abdominal surgical procedures, but it failed to reduce opioid-related side effects in the early post-operative period [3]. Moreover, some study concluded that a single dose of parecoxib 40 mg was safe and unlikely to cause adverse effects in breastfed infants as its relative infant dose was well below the recommended safe level of 10% exposure. The present study aims to evaluate the effectiveness of parecoxib versus tramadol in post-operative pain after caesarean section and to compare side effect profiles of both drugs. If the effectiveness and safety of parecoxib could be evaluated, it may be administered as an alternative to opioid injection thereby reducing opioid related side effects in women undergoing caesarean delivery.

Study Method

Eligible women were recruited and explained about the study. Women who agreed to participate were included and written informed consent were obtained. Eighty participants were enrolled using block randomization, excluding those with hypersensitivity to parecoxib, tramadol and ketorolac, underlying poorly controlled medical conditions, who needed additional procedure during operation such as bladder or bowel repair, and prolonged operation more than 2 hours. Twenty randomly sequenced blocks of four participants were used to ensure equal allocation, with each block assigning two participants to Group A (Parecoxib) and two to Group B (Tramadol).

Patients in the parecoxib group received a slow intravenous injection parecoxib 40 mg (2ml solution) 2 hours after spinal anaesthesia. Patients in the tramadol group received a slow intravenous injection for 10 minutes of tramadol 1mg/kg with 9ml of distilled water at the same time as parecoxib. Pain relief was noted by visual analog scale at 2,4,6 and 12 hours after completion of caesarean delivery. Additional analgesia (rescue analgesia) was administered at the request of patient (VAS score more than or equal to 6) and managed by giving 30mg ketorolac intravenous injection for one time. The number of patients requiring rescue analgesia and total doses of rescue analgesics within 12 hours were recorded. Side effects of parecoxib and tramadol according to drug profiles including nausea, vomiting, drowsiness, rash, hypotension, dyspepsia, headache, palpitation, and constipation were also monitored and recorded. Vital parameters observation (maternal pulse rate, respiratory rate, and blood pressure) was assessed and recorded.

Results

1. Background characteristics of two study groups

Among 40 patients of study population in parecoxib group, 22.5%, 42.5% and 35% of patients were in the age group of <30, 30-34 and ³35 years respectively. In the other group, 42.5 % and 32.5% were in <30 and 30-34 years age groups, and 25% of patients were in ≥ ≥35 years age groups. In both study group, 27.5% of patients were primigravida. Majority of patients in both groups were gravida 2 and above.

Regarding the race distribution, 42.5%, 17.5%, 25% and 15% were Myanmar, Chinese, Indian and others respectively in parecoxib group. On the other side, Myanmar, Chinese, Indian and others respectively were 47.5%, 12.5%, 22.5% and 17.5%.

Parecoxib group contained primary school, middle school, high school and graduated levels. They were 5%, 32.5%, 32.5% and 30% respectively. Whereas they were 12.5%, 27.5%, 25% and 35% in tramadol group.

The occupation among study population showed that 55% in Parecoxib group and 37.5% in Tramadol group were dependent women. In addition, manual worker and government employee comprised 5% and 12.5% respectively in Parecoxib group and 2.5% and 10% in Tramadol group. Only 10% in parecoxib and 17.5% in tramadol groups were professional worker. Women who worked as shopkeeper and agents were categorized as others and 17.5% in parecoxib and 32.5% in tramadol groups belonged to these group.

Out of 80 patients, 55% of patients in both groups had previous uterine scar.

Background characteristics	Parecoxib group	Tramadol group	p value
Age groups (years)			
<30	9 (22.5)	17 (42.5)	**0.16**
30-34	17 (42.5)	13 (32.5)	
□35	14 (35.0)	10 (25.0)	
Gravida			
G1	11 (27.5)	11 (27.5)	**0.525**
G2	22 (55.0)	18 (45.0)	
>G2	7 (17.5)	11 (27.5)	
Race			
Myanmar	17 (42.5)	19 (47.5)	**0.902**
Chinese	7 (17.5)	5 (12.5)	
Indian	10 (25.0)	9 (22.5)	
Others	6 (15.0)	7 (17.5)	
Education			
Primary	2 (5.0)	5 (12.5)	0.612*
Middle	13 (32.5)	11 (27.5)	
High	13 (32.5)	10 (25.0)	
Graduate	12 (30.0)	14 (35.0)	
Occupation			
Dependent	22 (55.0)	15 (37.5)	0.361*
Manual worker	2 (5.0)	1 (2.5)	
Government staff	5 (12.5)	4 (10.0)	
Professional	4 (10.0)	7 (17.5)	
Others	7 (17.5)	13 (32.5)	
Previous Uterine Scar			
Yes	22 (55.0)	22 (55.0)	**1**
No	18 (45.0)	18 (45.0)	

Table 1: Background characteristics of two study groups (*Fisher's exact p value)

2. Distribution of VAS score at different follow up period by study groups

In parecoxib group, mean VAS after 2 hours, 4 hours, 6 hours and 12 hours of caesarean section were 0.9, 1.72, 4.15 and 4.78 respectively.

In tramadol group, mean VAS after 2 hours, 4 hours, 6 hours and 12 hours of caesarean section were 1.05, 1.9, 4.68 and 4.55 respectively.

	Group	Mean	Std Deviation	N
VAS at 2 hr after CS	Parecoxib	0.90	0.55	40
	Tramadol	1.05	0.55	40
VAS at 4 hr after CS	Parecoxib	1.72	0.60	40
	Tramadol	1.90	1.03	40

VAS at 6 hr after CS	Parecoxib	4.15	0.74	40
	Tramadol	4.68	0.97	40
VAS at 12 hr after CS	Parecoxib	4.78	0.77	40
	Tramadol	4.55	0.85	40

Table 2: Distribution of VAS score at different follow up period by study groups

3. Comparison of estimated marginal mean between two study groups

It was found that VAS score of parecoxib within 12 hours of caesarean section ranged from 2.76 to 3.02 with estimated marginal mean (SD) 2.89 ± 0.07. But that of tramadol group was higher than parecoxib, VAS estimated marginal mean (SD) 3.04 ± 0.07 within the range of 2.91 to 3.17.

Group	Mean	Std. Error	95% Confident Interval	
			Lower Bound	Upper Bound
Parecoxib	2.89	0.07	2.76	3.02
Tramadol	3.04	0.07	2.91	3.17

Table 3: Comparison of estimated marginal mean between two study groups (Repeated measured ANOVA F statistic = 2.879, p value = 0.094).

4. Changes of VAS score at different follow up by study groups

The changes of VAS score by estimated marginal means of two drugs at 2, 4, 6 and 12 hours after caesarean section were followed up. It was found that VAS scores of tramadol were higher than parecoxib in 2,4 and 6 hours follow up. Although mean VAS score of tramadol was lower at 12 hours follow up than that of parecoxib.

VAS	**Study Group**		**p value**
	Parecoxib	**Tramadol**	
At 2 hr after CS			
0-2	40 (100.0)	39 (97.5)	1.000*
3-4	0 (0.00)	1 (2.5)	
At 4 hr after CS			
0-2	37 (92.5)	31 (77.5)	0.136*
3-4	3 (7.5)	7 (17.5)	
5-6	0 (0.00)	2 (5.0)	
At 6 hr after CS			
3-4	33 (82.5)	22 (55.0)	0.022*
5-6	6 (15.0)	15 (37.5)	
7-8	1 (2.5)	3 (7.5)	
At 12 hr after CS			
0-2	1 (2.5)	1 (2.5)	0.797*
3-4	8 (20.0)	11 (27.5)	
5-6	30 (75.0)	28 (70.0)	
7-8	1 (2.5)	0 (0.0)	

Table 4: Comparison of VAS between two study groups at different follow up (* Fisher's exact p value**).**

5. Comparison of VAS between two study groups at different follow-ups

At 2 hours of caesarean section, after injection of each drug, all patients in parecoxib group and 97.5% of patients in tramadol group had VAS score 0-2 (excellent pain relief). Only 2.5% in tramadol group had VAS 3-4 (good pain relief). There was not statistically significant difference (p=1) at 2 hours after operation.

Out of 40 patients, 92.5% and 7.5% of patients in parecoxib group had VAS 0-2 and 3-4 respectively at 4 hours follow up. In tramadol group,77.5%, 17.5% and 5% of patients had VAS score 0-2, 3-4 and 5-6 (satisfactory pain relief) respectively. No statistically significant difference (p=0.136) was found at VAS at 4 hours follow up.

After 6 hours of caesarean section, VAS score 3-4 in 82.5%, VAS 5-6 in 15% and VAS 7-8 (unsatisfactory pain relief) in 2.5% were noted in parecoxib group. On the other arm, 55%, 37.5% and 7.5% of patients had pain scores of 3-4, 5-6 and 7-8 respectively. There was statistically significant difference between parecoxib and tramadol groups at 6 hours of caesarean section (p=0.022).

The distribution of VAS score at 12 hours of caesarean section in caesarean section in parecoxib group showed that 2.5%, 20%, 75% and 2.5% of patients had score 0-2, 3-4, 5-6 and 7-8 respectively. In tramadol group, 2.5%, 27.5% and 70% of patients were VAS 0-2, 3-4 and 5-6 respectively but no patients suffered unsatisfactory pain score (VAS 7-8). No statistically significant difference was also found in 12 hours VAS.

Side Effects	Study Group		p value
	Parecoxib	Tramadol	
Nausea	0 (0.00)	8 (20.0)	0.005*
Vomiting	2 (5.0)	3 (7.5)	0.500
Drowsiness	0 (0.0)	8 (20.0)	0.005*
Headache	0 (0.0)	7 (17.5)	0.012*

Table 5: Comparison of side effects between two study groups (* Fisher's exact p value)

6. Comparison of side effects between two study groups

2 patients (5%) in the parecoxib group suffered vomiting after administration of drugs and 3 patients (7.5%) in tramadol group. There was no statistical significance between parecoxib and tramadol groups regarding the symptom of vomiting.

However, nausea, drowsiness and headache did not occur in parecoxib group. In tramadol group, 20%, 20% and 17.5% experienced nausea, drowsiness and headache respectively. Therefore, symptoms such as nausea, drowsiness and headache were statistically significant different between two groups.

Group		N	Mean	Std. Deviation	t statistics	p value
SBP changes	Parecoxib	40	0.00	8.2	0.034	0.973
	Tramadol	40	-0.13	21.9		
DBP changes	Parecoxib	40	-2.63	6.6	-0.973	0.333
	Tramadol	40	-0.88	9.3		
PR changes	Parecoxib	40	-2.13	6.0	-0.950	0.345
	Tramadol	40	-1.15	2.5		
RR changes	Parecoxib	40	0.10	0.8	3.222	0.002
	Tramadol	40	-0.63	1.2		

Table 6: Comparison of changes (Before – After) of vital signs between two groups

7. Comparison of changes (Before-After) of vital signs between two groups

There were no significant changes between SBP and DBP after injection of parecoxib with the mean (SD) of 0.00±8.2 and -2.63±6.6 respectively. Mean (SD) SBP changes of -0.13±21.9 and that of DBP -0.88±9.3 were found in tramadol group. Also, no significant pulse rate changes were experienced in both parecoxib and tramadol with mean (SD) of -2.13±6 and -1.15±2.5 respectively. There were statistically significant differences between the respiratory rate before and after injection of each drug with mean (SD) of 0.1±0.8 and -0.63±1.2 in parecoxib and tramadol groups respectively (p=0.002).

Requirement of rescue analgesia	Study Group		p value
	Parecoxib	Tramadol	
Yes	4 (10.0)	8 (20.0)	0.210
No	36 (90.0)	32 (80.0)	

Table 7: Comparison of rescue analgesic requirement in two study groups

8. Comparison of rescue analgesic requirement in two study groups

4 patients (10%) in parecoxib group and 8 patients (20%) in tramadol group needed rescue analgesic (ketorolac injection). In parecoxib group, number of patients who needed rescue analgesic were fewer than that of tramadol group. But it is not statistically significant difference.

9. Comparison of mean time to rescue analgesia between two groups

Patients in the parecoxib group needed rescue analgesics at mean (SD) time in minute of 540±207.8 and that of tramadol needed at 405±127.3. It showed that duration of analgesic effect was longer in parecoxib group than in tramadol group (p=0.176).

10. Comparison of mean duration of CS between two groups

There was statistically significant difference between duration of caesarean section in parecoxib and tramadol groups with the mean (SD) of 56.4±12.8 and 50.9±11,5 respectively (p=0.046).

Discussion

Background characteristics of two study groups

Pre-existing pain, anxiety, age and type of surgery are the four significant predictors for post operative pain intensity. The type of surgery, age and psychological distress are the three most important predictive factors for post operative analgesic consumption [4].

There is evidence that advancing age appears to reduce the influence of specific genes on the experience of pain [5]. In the present study, majority of patients (65%) in parecoxib and (75%) in tramadol groups were less than 35 years and then the rest were elderly mother. There were no statistically significant differences between two groups.

Regarding the parity, [6] showed that total post operative parecoxib consumption in low-risk term pregnancies. Mean parity was 2.4±0.7 in study group and 2.2±0.7 in control group. Result was not significantly different between groups. In the present study, 72.5% in both parecoxib and tramadol groups were primigravidae. Gravida distributions were similar between group and no significant difference (p=0.525).

An American study proved that Latin America and Asia women usually perceive less pain than European women [7]. Race distribution was also studied in this study, 77.5% in parecoxib group and 65% in tramadol group were Myanmar and other ethnicity comprised nearly half of the proportion. But there was no significant ethnicity on pian in this study.

In the present study, more than half of women in both groups were higher education and above. All women were properly counselled about detailed procedure before operation to reduce anxiety. Therefore, educational status was not shown to influence on post operative pain.

Regarding occupational status among study population, ³95% of patients in both groups were non-manual workers and minority were working as manual workers. Occupation did not have significant effects on post operative pain relief in this study.

All participants were low risk pregnancy and were scheduled for elective surgery. Therefore, type and indication of surgery were mostly similar between groups. In this study, 55% of patients in both groups had previous uterine scar [2]. observed that there was no statistically significant difference in post operative pain whether it was repeat or primary caesarean section.

Pain score at different follow-up periods of study population

The onset of analgesic of parecoxib was 7-14 minutes and reached a peak effect within 2 hours. Whereas analgesic effect of tramadol is induced one hour after administration and peaks occurred after 2 to 3 hours.

The mean VAS after injection of parecoxib ranged from 2.76 to 3.02 with the mean (SD) of 2.89±0.07. Tramadol had the range

between 2.91 and 3.17 with the mean (SD) of 3.04±0.07. It showed that parecoxib had lower pain score and more satisfactory pain relief than tramadol.

After 2 hours of caesarean section, the mean VAS of parecoxib was 0.9±0.55 and that of tramadol was 1.05±0.55. The mean VAS of parecoxib was slightly lower than tramadol at 2 hours VAS because of rapid onset of action of parecoxib.

The distribution of VAS at 4 hours after caesarean section in the parecoxib group was 1.72±0.6 and that in the tramadol group was 1.9±1.03. It revealed that VAS of parecoxib was still lower than tramadol at 4 hours after operation.

In parecoxib group, the mean VAS of 4.15±0.74 and 4.68±0.97 were 6 hours and 12 hours after caesarean section respectively. On the other side, it was 4.68±0.97 and 4.55±0.85 in tramadol. It meant that 6- and 12-hours VAS scores of both groups were higher than 2- and 4-hours VAS scores. This suggested that the effects of both analgesics start weaning off by 6 hours after caesarean section. When contrasting VAS scoring of time on a linear graph (Figure 1), pain control of parecoxib was better than tramadol in 2, 4 and 6 hours of caesarean section. When comparing VAS score at 12 hours, it showed that parecoxib was slightly higher pain score than tramadol. 10% of patients in parecoxib group and 20% from the rest required rescue analgesic for pain relief at 6- and 12-hours follow-ups because VAS was ³6 at that time. It was observed that most of the patients in parecoxib group had lower VAS score after operation and received less extra analgesic than patients in tramadol group.

Therefore, the level of pain relief in terms of VAS after injection of analgesics was comparable in both groups at 2 and 4 hours after caesarean section. But analgesic efficacy and rescue analgesic requirement were different in 6 and 12 hours. Analgesic efficacy of parecoxib seemed to be longer than tramadol according to this study.

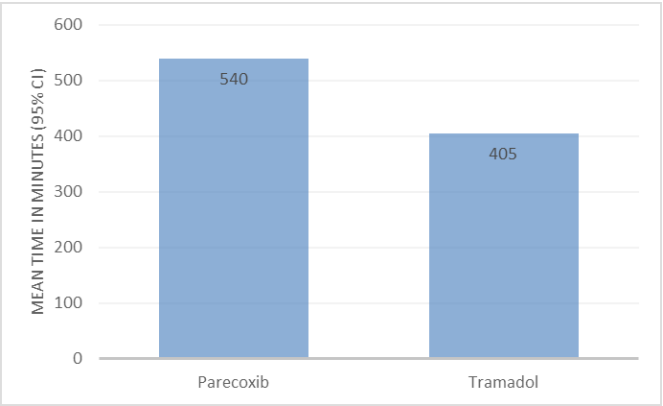

Figure 1: Comparison of mean time to rescue analgesia between two groups

Level of pain relief with time after drug administration

According to present study, the mean VAS of parecoxib at 2 and 4 hours after surgery were comparable with that of tramadol. The mean VAS was significantly reduced at 6 hours in parecoxib than that in tramadol. It was statistically significant. At 12 hours follow-up, mean VAS seemed to be slightly higher in parecoxib than tramadol. It was because patients in the parecoxib group had less rescue analgesic requirements at 6-hour follow-up than tramadol. Therefore, VAS score of parecoxib group at next follow-up (twelve hours) was slightly increased than tramadol.

Adverse effects of drugs in the study population

The goal of post operative management is to reduce or eliminate pain and discomfort with a minimum side effect. Opioids have been the mainstay of post operative pain control for decades. However, opioid analgesics are associated with several limitations. Gastrointestinal side effects such as nausea and vomiting, respiratory side effects, sedation and abuse potentially limit their usage. Parecoxib is a water soluble pro-drug of non-steroidal anti-inflammatory drug, and a potent and selective inhibitor of cyclo-oxygenase 2 (COX 2) isoenzyme. Despite some adverse effects like cutaneous reactions and thromboembolic events, they are useful alternative to opioids in managing surgical patients.

According to the study of [8], incidence of nausea (45%) and vomiting (45%) were reported by the patients in the group of tramadol which were higher than that of parecoxib. This was the study which compared the post operative analgesic effects of buterophenol, parecoxib and tramadol in patients undergoing major surgeries. In the present study, no patients suffered nausea in parecoxib but 20% suffered nausea in tramadol group. It was statistically significant difference between two groups. Whereas 20% and 17.5% of patients in tramadol group reported drowsiness and headache respectively. But no patients in parecoxib group suffered those symptoms which showed statistically significant difference. Vomiting was reported by 5% of patients in parecoxib group and 7.5% in tramadol group. This finding was like the study conducted by [8]. In contrast to findings of two studies, side effects were more experienced in patients of tramadol group because of centrally acting analgesic effect of tramadol on serotonergic and noradrenergic nociception.

In this study, there was no patients who had significant blood pressure and pulse rate changes after administration of both drugs. However, significant respiratory rate changes were noted between the drugs. Mean respiratory rate changes of parecoxib was 0.1±0.8 and that of tramadol was -0.63±1.2. Slightly increased respiratory rate was found in patients of tramadol group. It may be due to fact that patients in tramadol group suffered more pain than that of parecoxib.

In this study, it was found that patients in the parecoxib group experienced less nausea, vomiting, drowsiness and headache than tramadol group. There was no significant change in vital parameters of both women in both groups. From these findings, parecoxib is an analgesic with better side effect profile than tramadol.

Rescue analgesic requirement in the study population

In the present study, only 10% of patients in the parecoxib group required rescue analgesic. But in the tramadol group, it doubled. The mean time to first administration of rescue analgesic was 540±4 min in parecoxib group and 405±8 min in tramadol group. According to above data, pre-emptive parecoxib provided longer duration of post operative analgesia and reduced requirement for rescue analgesic compared with tramadol. This was provided by mean duration of caesarean section between two groups. It was found that mean duration of surgery was longer in parecoxib group (56.4 min) than that of tramadol (50.9 min). In parecoxib group, even though duration of surgery was prolonged, it provided more effective analgesia than tramadol.

Conclusion

Caesarean section rates are increasing worldwide, and effective pain relief is a key priority. Pain management in women after caesarean section is almost exclusively neuraxial, pre-emptive analgesic use is limited by fetal drug transfer, and postoperative analgesic given to the mother have the potential for transfer to the breastfeeding neonate. In addition to pain relief, optimal management of patients after caesarean delivery should address the goals of maximizing maternal mobility and rapid recovery. Therefore, the need for analgesia to overcome post operative pain is highly requested by women today. In developing countries, parentral single dose analgesics such as parecoxib and tramadol can be considered for relieving acute pain.

This was hospital-based study carried out in Central Women Hospital (Yangon). In this study, either intravenous parecoxib 40 mg or intravenous tramadol 1mg/kg was given randomly to 80 women who underwent caesarean section. The level of pain relief was noted by visual analog scale at 2, 4, 6 and 12 hours after caesarean section. Adverse effects of drugs and total numbers of rescue analgesic requirement were noted.

The mean VAS of parecoxib group was 2.89±0.07 and that of tramadol group was 3.04±0.07. According to side effects profile, only two patients in parecoxib group suffered vomiting. But nausea, vomiting, drowsiness and headache occurred in 8, 3, 8 and 7 patients respectively in tramadol group. On comparing rescue analgesic requirement, 10% of patients in parecoxib and 20% in tramadol required injection ketorolac for pain relief.

According to this study, pain score was reduced in parecoxib group. It meant that level of pain relief was better in parecoxib than that of tramadol. Nausea, vomiting and drowsiness were found only in tramadol. Parecoxib showed significant opioids sparing side effects in this study. No life-threatening side effects were found in both groups. Moreover, rescue analgesic requirement in parecoxib was less than that of tramadol.

To be concluded, both drugs can be used as effective post operative analgesia. However, parecoxib not only has slightly better analgesic efficacy than that of tramadol but also avoids opioids side effects of tramadol. Therefore, the use of parecoxib should be recommended instead of opioids to achieve optimal pain management with tolerable side effects profile after caesarean delivery. Moreover, this study is helpful in obstetric practice for post operative pain control after elective caesarean section.

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