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Influence of Intrapleural Infusion of Marcaine on Post Thoracotomy Pain

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ABSTRACT

***Background**: Pain control after thoracotomy is an important issue. "Optimal pain control methods" for decreasing the post thoracotomy pain are a matter of debate among many surgeons. Ideal methods should have high success rate, easy implementation and minimal complications. This study was designed to evaluate the effect of intrapleural injection of marcaine in comparison to systemic analgesics (Pethidine) on post thoracotomy pain.*

***Materials and Methods:** This clinical trial was designed to compare the efficacy of a systemic agent (control group) and infusion of analgesic drug (case group) through an intrapleural catheter for post thoracotomy pain relief. The subjects had undergone postero-lateral thoracotomy and the two groups were compared with regard to age, gender, education, smoking, alcohol abuse and history of infectious diseases. All data were statistically analyzed using chi-square and t- student tests and p<0.005 was considered as significant.*

***Results**: Frequency distribution of pain within the first 24 hours showed marked decrease in severity of pain in both case or control group (P=0.00).*

Mean differences in pain score within the first 24 hours was 2.18 in the case group and 2.13 in the control group.(P=0.68). No significant difference was detected between the two groups.

Conclusion**: For relieving post thoracotomy pain, intrapleural infusion of marcaine can be as effective as a systemic agents (pethidine) with regard to the negligible side effects and feasibility of use in either post thoracotomy or traumatic patients, intrapleural route can be used for selected patients as the method of choice. **(Tanaffos 2007; 6(1): 47-51)

***Key words**: Post operative pain, Thoracotomy, Marcaine*

INTRODUCTION

Post thoracotomy pain is crucial in nature and is usually related to injury of the chest wall, intercostal nerves and more sensitive tissues such as the parietal pleura. This pain can also impair the pulmonary function and cause other serious complications (1, 2, 3). Although different methods have been introduced for relieving post-thoracotomy pain, debate exists over the optimal pain control

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method, and decreasing the post operative pain has remained one of the most anxious points for many surgeons. An ideal method should have a high success rate, with easy implementation and minimal complications (4, 5, 6).

Although systemic analgesics can decrease post-thoracotomy pain dramatically, these agents have serious side effects. However, various routes are available for infusion of analgesic agents for post-thoracotomy patients such as epidural, paravertebral, intrapleural and subpleural routes (7, 8, 9, 10). Other procedures have also been recommended for decreasing post-operative pain, among which, preemptive analgesia of the skin, video assisted thoracic surgery (VATS), electro acupuncture and recently, "Patient Control Analgesia" (PCA) in combination with regional blockage can be mentioned (11,12,13,14).

This study was designed to evaluate the effect of intrapleural injection of marcaine in comparison to systemic analgesics (Pethidine) on post-thoracotomy pain.

MATERIALS AND METHODS

This was a prospective clinical-trial performed on all patients admitted to the thoracic surgery department during a-one-year period. Forty patients (33 males and 7 females) were selected and after explaining ethical issues, they were randomly placed in the case (intrapleural infusion) or control (systemic injection) group. All subjects were candidates for the operation and underwent standard postero-lateral thoracotomy with or without pulmonary resection and those with other types of incisions were excluded from the study. The two groups were compared for age, sex, level of education, smoking habit, alcohol consumption and previous history of pulmonary infections. Addicts those younger than 18 years and patients with multiple trauma were excluded from the study.

In the case group, a cut down tube (F8-10) was inserted through the last hole of chest tube at the end of the operation. During the post-operative period 1.5 to 2 mg /kg of marcaine (0.025 mg %) was infused with 6 hour intervals (according to the patient's demand). The patients were questioned for severity of pain using a visual analog pain score (VAS) before, and one hour after infusions.

In the control group, the patients were sedated with pethidine 0.5-1 mg/kg intravenously, at the same interval and scale method.

All data were analyzed statistically with chi-square and t-student tests for relative and absolute frequency and $p<0.005$ was considered significant.

RESULTS

Distribution of relative frequency in respect to injection time and severity of pain within the first 24 hours delineated pain relief in both case (intrapleural infusion) and control groups (pethidine injection) ($p=0.00$) and no significant differences were detected between the two groups ($t=12.53$). Clearly, the need for injection of analgesia decreased in both groups during the elapsed time of operation. More details about the results are shown in tables 1and 2.

Mean difference of pain score within the first 24 hours was 2.18 in the case group and 2.13 in the control group ($p=0.68$). However, on the second 24 hours, the score for intrapleural injection was 1.76 in the case group compared to 1.24 in the control group ($p=0.71$). More details of acquired data are shown in tables 3 and 4.

No significant side effect was detected in both groups except for mild headache and mild hypertension in two patients in the case (intrapleural) group.

Table 1. Relative frequency distribution within respect to intervals and severity of pain in the control group(systemic injection) within the first 24 hours.

Time of injection	Before injection					After injection				
Severity of pain	Without	Mild	Moderate	Severe	Very severe	without	Mild	Moderate	Severe	Very severe
First	0%	0%	5%	90%	5%	30%	65%	5%	0%	0%
Second	25%	0%	5%	65%	5%	40%	55%	5%	0%	0%
Third	85%	0%	0%	15%	0%	95%	5%	0%	0%	0%
Fourth	95%	0%	0%	5%	0%	95%	5%	0%	0%	0%

(t= 12.53 P=0.00)

Table 2. Relative frequency distribution in respect of intervals and severity of pain in the case group(intrapleural infusion) within the first 24 hours

Time of infusion	Before infusion					After infusion				
Severity of pain	without	Mild	Moderate	Severe	Very severe	without	Mild	Moderate	Severe	Very severe
First	0%	5%	0%	55%	40%	10%	60%	15%	15%	0%
Second	30%	0%	0%	40%	30%	35%	50%	15%	0%	0%
Third	55%	0%	10%	30%	5%	70%	20%	10%	0%	0%
Fourth	90%	0%	0%	0%	10%	90%	5%	0%	5%	0%

(t=12.54 P=0.00)

Table 3. Distribution of relative and absolute frequencies of pain within the first 24 hours.

Pain score	1----2		2.1---3		Mean difference	Standard deviation (SD)
Cases	14	70%	6	30%	2.18	0.78
Controls	11	55%	9	45%	2.13	0.79
Total	25	62.5%	15	37.5%		

(t=0.5 P=0.68)

Table 4. Distribution of relative and absolute frequencies of pain within the second 24 hours

Pain score	1----2		2.1---3		Mean difference	Standard deviation (SD)
Cases	15	75%	5	25%	1.76	0.86
Controls	16	80%	4	20%	1.24	1.18
Total	31	77.5%	9	22.5%		

(t=0.49 P=0.71)

DISCUSSION

Our findings showed acceptable pain relief in both groups, and no significant difference was identified between the two methods. While the systemic route usually needs repeated injections and can also impose serious side effects, the intrapleural route has negligible side effects and considerably safer than systemic narcotic injections.

Although other studies, suggest epidural infusion for post-thoracotomy analgesia (1) it should be mentioned that use of the epidural route usually requires special instruments (Epidural catheter) and is a difficult procedure which may not be possible in every center, while intrapleural infusion is applied through the chest tube and there is no need for additional instruments. The intrapleural route can be used in traumatic patients with rib fracture or other conditions needing chest tube insertion. According to recent studies enhanced analgesic effects can be achieved through the intrapleural route if marcaine is infused continuously.

Although, we did not encounter complications in our series, complications of marcaine such as cardiac toxicity, increased blood pressure and headache have been reported mostly in patients under 16 years and those with history of hypertension (8, 9, 10).

CONCLUSION

For post-thoracotomy pain, intrapleural infusion of marcaine can be as effective as a systemic agent (pethidine). But in view of the negligible side effects and ease of use, the intrapleural route can be used for selected patients as the method of choice.

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