



## Research Paper: Analgesic Effect of Apotel Versus Pethidine After Hemilaminectomy



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**Running Title** Apotel Versus Pethidine After Hemilaminectomy

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### ABSTRACT

**Background:** Postoperative pain is a common phenomenon, and its management affects considerably on the recovery process, and patients' satisfaction. Apotel and pethidine are two conventional medicines used to relieve pain after operation.

**Objectives:** The present study aimed to compare the effect of intravenous injection of Apotel and intramuscular injection of pethidine in relieving pain after hemilaminectomy.

**Materials & Methods:** In the present cross-sectional study, 150 patients who underwent hemilaminectomy were recruited between May 2015 and November 2015. They were taking either Apotel (n=75) or pethidine (n=75) after the operation, which was done at Poursina Hospital affiliated to Guilan University of Medical Sciences, Rasht City, Iran. The patients' pain levels were measured using Visual Analog Scale (VAS), and the results were compared between the 2 groups.

**Results:** There was no significant difference in the total VAS score between the Apotel and pethidine groups (P=0.189). However, there was a significant reduction in VAS score hours 2 (P=0.03) and 4 (P=0.004) hours after the injection of Apotel in this group, compared with those scores in the pethidine group. Also, VAS scores at other times (8, 12, 20, 28 hours after the injection) were lower than those in the pethidine group, but the difference was not significant.

**Conclusion:** Apotel was better pain-killer in the early hours after the first injection compared to pethidine. But its effect was similar to pethidine at the late hours after the first injection. Therefore it seems that Apotel is better painkiller after laminectomy, especially in the early hours after the operation.

**Keywords:** Laminectomy; Analgesics; Pain; Visual Analog Scale

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## Highlights

- Apotel is the better pain-killer at the early hours after the first injection compared to pethidine.
- Apotel is similar to pethidine at the late hours after the first injection.

## Introduction

**P**ain is a common complaint after trauma and elective neurosurgery [1]. Despite efforts to control acute pain after the operation, it has remained a significant clinical challenge. Studies report adrenal hyperactivity, atelectasis, tachycardia, deep vein thrombosis, and hypertension after unsuccessful pain relief [2-5]. Narcotics are usually commonly-used pain killers, despite their side effects such as nausea, vomiting, confusion, constipation, and the possibility of addiction [6-9]. Furthermore, Nonsteroidal Anti-Inflammatory Drugs (NSAIDs), which also have analgesic effects, are prescribed because of their fewer side effects and cheaper price, notwithstanding lack of effectiveness in relieving pain [2, 6, 10-13].

According to the reports, 77% of patients undergoing hemilaminectomy experience postoperative pain [14, 15]. In this regard, many studies have assessed analgesic effects of narcotics or NSAIDs on soft tissues. However, if narcotics are used for pain reduction in clinics, their side effects (e.g. vomiting, hypotension, and respiration distress) should be monitored. Also, narcotics are now increasing replace NSAIDs in clinical use. For example, Apotel, which is an NSAID with analgesic effects, may be a good alternative to pethidine, a synthetic narcotic pain killer of the phenylpiperidine class. Pain management is absolutely necessary regarding the severity of pain after neurosurgical operations. A few studies have compared analgesic effects of Apotel and pethidine in the clinical settings. Hence, in the present study, we examined the impact of Apotel and pethidine in relieving pain after hemilaminectomy.

## Materials and Methods

In the present cross-sectional study, the analgesic effect of Apotel and pethidine was compared in adult patients undergoing hemilaminectomy. The present study was approved by the Ethics Committee of Isfahan University of Medical Sciences. The medical records of 150 patients undergoing hemilaminectomy and taking either Apotel (15 mg/kg, Intravenous [IV]) (n=75) or pethidine (0.5 mg/kg, Intramuscular [IM]) (n=75) after the opera-

tion were assessed. They underwent hemilaminectomy an operation at Poursina Hospital, Guilan University of Medical Sciences, Rasht City, Iran, between May 2015 and November 2015. To avoid respiratory depression, we assessed the effect of intramuscular injection of pethidine, not its intravenous injection.

The inclusion criteria were having undergone hemilaminectomy, being older than 20 years, lacking history of seizure, and allergy to NSAID, Apotel, or pethidine treatments. Also, the patients with respiratory problems, cyanotic figure, bronchial discharge, and addiction to drugs were excluded from the study. The patients with a VAS score of less than 8 were excluded from the study. As a routine procedure, the painkiller injection first starts when a patient complains about pain and repeats every 8 hours. Due to half-life of the drugs, we expect that the painkilling effect remains until the next injection. The patients' pain level was measured according to VAS criteria 2, 4, 8, 12, 20, 28 hours after the first injection. The results were analyzed by the Chi-square test in SPSS V. 16. The Chi-square test, P value of less than or equal to 0.05 was considered as statistically significant.

## Results

The Mean±SD age of the patients in Apotel and pethidine groups were 41.48±6.3 and 43.03±6.1 years, respectively. There were 36 males and 39 females in the Apotel group and 39 males and 36 females in the pethidine group. About 86.6% and 80% of patients in Apotel and pethidine groups, respectively reported a history of taking painkillers Apotel.

There was no significant statistical difference in the total VAS score between Apotel and pethidine groups (P=0.189). There was a significant reduction in VAS score hours 2 (P=0.03) and 4 (P=0.004) hours after the first injection in the Apotel group, compared with those scores in the pethidine group. Moreover, the VAS score at other times (8, 12, 20, 28 hours after the injection) was lower than those in the pethidine group, but the difference was not significant (Table 1).

**Table 1.** Comparison of the VAS Mean±SD scores between Apotel and pethidine groups of patients after hemilaminectomy

Time After Operation (h)	Mean±SD		P
	Pethidine	Apotel	
2	7.17±1.37	6.69±1.29	0.03
4	6.42±1.29	5.77±1.35	0.004
8	5.43±1.33	5.11±1.22	0.107
12	4.57±1.30	4.25±1.21	0.128
20	3.65±1.27	3.37±1.12	0.136
28	2.47±1.21	2.37±1.08	0.760

The level of significance was set at P<0.05



## Discussion

In the present study, we compared the analgesic effect of Apotel was compared with pethidine, and the results showed a nonsignificant difference between the two groups regarding the pain level. According to time points results, Apotel showed a significant pain reduction on pain after 2 and 4 hours, compared to pethidine.

Bagi et al. studied the painkilling effect of Apotel and morphine in patients with acute renal colic and reported no relationship between the history of painkiller use and the relieving effect of the medicines [16]. In another study, the analgesic effect of meperidine and paracetamol was compared after appendectomy, and no relationship between the history of painkiller use, severity of pain, and recovery was reported [17].

Bektas et al. compared the analgesic effect of paracetamol and morphine in patients with renal colic and found no difference between two groups of Apotel and pethidine receivers in the first 24 hours (average (covariance) of pain levels in paracetamol and morphine groups were 4.1 (0.7) and 3.8 (1.2), respectively) [18]. Serinken et al. compared the analgesic effect of paracetamol with morphine in renal colic and showed that average (covariance) pain level in paracetamol and morphine groups were 7.2 (1.1) and 5.4 (4.3), respectively [19].

The authors showed a significant difference in analgesic effect in the first 24 hours, which could be explained by differences in the type of operation and tissues involved. Craig et al. reported no significant difference in the analgesic effect of paracetamol and morphine in traumatic limb pain in the emergency room [20]. Besides, the analgesic effect of ketorolac with intravenous

morphine in patients with limb injury was compared, and intravenous ketorolac was found to be more effective in reducing pain; however, the differences between morphine and ketorolac was not significant [21].

Analgesic effect of paracetamol versus morphine was assessed in 60 subjects with acute limb trauma [22]. The authors evaluated pain 30 minutes after administration of paracetamol (n=30 subjects) and morphine (n=30 subjects) and reported that pain level reduced in paracetamol group, compared to morphine group. Serinken et al. compared intravenous paracetamol and morphine administration in reducing sciatica pain in 300 subjects [23]. They were divided into three groups receiving intravenous morphine with a dose of 0.1 mg/kg, paracetamol with a dose of 1 g in adult patients, and placebo. The pain level was evaluated 30 minutes after treatment, and the results showed that both paracetamol and intravenous morphine were effective in reducing sciatica pain. However, morphine was preferred for such patients.

The efficacy of paracetamol injection was compared with intravenous morphine (patient-controlled analgesia) on controlling pain of the patients undergoing arthroscopic knee surgery [24]. The authors selected 2 groups with knee arthroscopic surgery (30 participants in each group) and treated them with paracetamol and morphine and their pain level was evaluated 3, 6, and 24 hours after the treatment. The results showed no significant difference between the 2 groups in pain reduction; however, approximately 23.3% of morphine receivers showed side effects such as nausea and vomiting.

Pethidine is a narcotic and analgesic medication and used to relieve moderate to severe pain, including pain after neurosurgery. It shows adverse effects such as

vomiting, hypotension, and respiration distress. Prolonged use of pethidine brings about morphine-type dependence. Apotel is also used for pain relief and is generally considered safe. The use of Apotel as a pain killer has limited evidence at the emergency department. Substitution of Apotel for pethidine may have benefits because of several side effects of pethidine in clinical settings, especially neurosurgery departments.

The findings of the present study suggest that analgesic effect of Apotel is comparable to that of pethidine after hemilaminectomy. More precisely, there was a significant reduction in pain during the early hours after the first injection in the Apotel group, compared the pethidine group. But it was similar in both groups at the late hours after the first injection. Therefore it seems that Apotel is a better painkiller after laminectomy, especially in the early hours after operation when the patient has more stress and needs more urgent pain relief. As the effects of Apotel and pethidine are similar even in the late hours after the first injection, it is logical to use Apotel as a pain-killer to prevent respiratory suppression and the dependency effects of pethidine. Thus, replacement of pethidine with Apotel is suggested in the neurosurgical departments after hemilaminectomy. Further investigations in the other types of operations are recommended.

## Conclusion

Apotel was a better pain-killer during the early hours after the first injection compared to pethidine. But its effects were similar to pethidine at the late hours after the first injection. On the whole, it seems that Apotel is a better painkiller after laminectomy, especially in the early hours.

## Ethical Considerations

### Compliance with ethical guidelines

The study protocol was approved by the Ethics Committee of Isfahan University of Medical Sciences (No. IR.GUMS.REC.1396.358). All the study procedures were in compliance with the ethical guidelines of the 2013 update of the Declaration of Helsinki.

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## Authors contributions

Contributing to the conception and design of the study: Mohammadreza Emamhadi, Hamid Behzadnia, and Sasan Andalib; Acquiring data: Seifollah Jafari and Mohammadreza Zamanidoost; Analyzing and interpreting the data: Sasan Andalib; Drafting, revising, and final approval and agreed to be accountable for all aspects of the work: All the authors.

## Conflict of interest

The authors declared no conflict of interest.

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