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ORIGINAL ARTICLE

Post laparoscopic pain control using local anesthesia through laparoscopic ports

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Abstract

Introduction: Although patients do not experience sever pain after laparoscopic surgery, most of them experience acute or chronic pain afterward. While conventional pain killers including NSAID and narcotics in laparoscopic surgery have specific side effects, their application is inevitable. This study compares the efficacy of local anesthetic drugs and conventional pain killers in post-operative pain control.

Methods: This prospec ve clinical trial was conducted in two groups of pa ents (n=93). Group 1, as control group, was given conventional pain killers such as narcotics and NSAIDs. In another group as treatment group, at the end of laparoscopic surgeries, prior to port withdrawal, a local anesthe c mixture, a short ac ng (Lidocaine 2%) plus a long ac ng (Bupivacaine 0.5%) is ins lled through the port lumen between the abdominal wall layers. The efficacy of both types of medications was compared with regards to their effectiveness and side effects.

Results: 85% of the control group, received 5 to 20ml Morphine for pain control while the others were controlled with trans-rectal NSAIDs. In the treatment group, the pain of 65% of the pa ents was controlled only by local anesthe c drugs, 30% required NSAIDs and the other 5% required narco cs administra on for pain control.

Conclusions: The administration of local anesthetic drugs after laparoscopic surgery is an effective method for pain control with a low complication rate and side effects of narcotics.

Key Words: Post laparoscopy; pain; local anesthetic

Introduction

Post-operative pain control is one of the main concerns which all surgeons seriously take into consideration. More than seventy percent of total patients in surgery wards have severe and intolerable pain requiring pain-killers [1]. Despite the administration of narcotics, three quarters of patients experiencing acute or chronic pain still have pain afterward [2]. Post-operative pain control is not only a philanthropic matter, but also has a very important physiologic role in post-operative consequences [3].

Conventional post-operative pain control methods consist of narcotics and non-steroidal anti-inflammatory drugs, (NSAID) which can control the pain very effectively, but their unwanted side effects lead to many complications. Although using narcotics is an effective method for post-operative pain control, but the presence of severe complications make application of these drugs less desirable.

One of the most effective ways to decrease the

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side effects is to decrease the dosage, which can affect the analgesic efficacy and render the drugs useless. Close monitoring and finding another safe and effective alternative for pain control, [4] are the other options.

Local anesthetic drugs (LADs) are increasingly being used intra-operatively for pain control. LADs have some beneficial effects when infiltrated locally and intra-peritoneally [5] In many types of laparoscopic surgeries, the procedure can be completed with only LADs, and no general or regional anesthesia is required such as dialysis catheter anesthetic drugs instillation [6].

Application of LADs is not limited to the skin incisions and there are other ways for application. Intra-peritoneal administration of local anesthesia is often used to improve pain relief after laparoscopic cholecystectomy. The use of intra-peritoneal local anesthesia is safe, and it results in a statistically significant reduction in early post-operative abdominal pain [6].

Application of the LADs after operation for pain killing is an effective method with few complications. In laparotomy incisions, especially large ones, the application of LADs is not a suitable modality because a high and unacceptable dosage is needed which can lead to complications. But in small-size laparoscopic incisions, LADs can be utilized in a safe dosage range with effective results [7].

We proposed, instillation of LADs through laparoscopic ports at the end of the operation during port withdrawal, can achieve effective results. This study compares the efficacy and side effects of conventional analgesics with LADs (a combination of short and long acting agents) in post-operative pain control.

Methods

During a 17-month period, 93 patients were divided into two groups and compared with each other. Group 1, the control group, consisted of 46 patients, 34 females and 12 males with an average age of 45. The average BMI was 32. Second group, consisted of 47 patients, 33 females and 14 male patients with average age of 43.5 year. The average BMI was 33.5 .All patients had gall stones and were scheduled for elective laparoscopic cholecystectomy and their post-operative pain was handled using two different methods: The control group was managed with the conventional pain killers (narcotics and NSAID) and the treatment group was controlled with local anesthetic drugs. All patients had to be in a narrow range of weight (maximally 10% difference from mean) and did not have to have acute cholecystitis (inflammation is an additional factor which can change the results). For ruling out an acute cholecystitis, we used clinical and sonographics findings. In each group the size and number of the ports were equal. The operation of both groups was performed with 3 ports, two 10 mm ports, one of them placed in supra-umbilicus (camera port) and the other placed in epigastrium for extracting the gall bladder. One 5 mm port was placed in the mid-clavicular line lateral to the umbilicus. At the final step of the operation after extracting the gall bladder, 80% of the abdominal gas was sent out and the ports were withdrawn slowly under direct vision. When the ports were passing through the abdominal wall layers, instillation of a local anesthetic mixture through the ports was started and continued up to the subcutaneous layer. Then facia defect of 10 mm ports were closed with separate nylon sutures and for 5 mm port we closed just skin incision. Finally, patients were sent to the surgery ward and were checked out by the nurses hourly to evaluate the pain severity. In both groups, if patients had intolerable pain, firstly a Diclofenac sodium suppository was prescribed and pain was checked for the next hour. If pain was not controlled, an intra-venous bolus dose of Morphine (5 mg) was administered and was repeated PRN every 4-6 hours. Morphine was the main narcotic for pain relief and the dosage range was between 5-10mg. The Local anesthetic mixture for each port consisted of 7ml 2% Lidocaine, 1ml Bupivacaine and 0.2ml Natrium Bicarbonate. Alkalinizing (Natrium Bicarbonate) the surgical incision can prolong the anesthetic time [6] and yield better results with lower doses of the drugs. Patient selection was based on the exclusion criteria for patients with gall stone. All of our patients were randomized simply into treatment and control group. The aims and advantages of this study were totally explained for all of the patients and consent from was taken.

Operation time was equal in both groups which did not show any significant difference. The average of operation time for groups 1 and 2 was 34 and 37 minutes, respectively. Operations lasting more than 60 minutes were excluded from the study. Prophylactic antibiotic therapy was just a single dose of second generation cephalosporin (1gr) pre-operatively and continued on the first day of operation. During the operation, all of the

patients received morphine as analgesic drug with a limited dose and if the patients needed more doses of morphine or needed other types of analgesics, they were omitted from the study. Side effects were recorded 4 hours after operation, because by this time the effects of general anesthetic drugs had partially cleared and any other side effect can be related to the pain killers.

Before the operation, the procedure was explained totally to the patients by the same surgeon. After their agreement and filling out the consent form, they were selected and entered the study. There was no ethical limitation.

Exclusion criteria: First: BMI more than 35. Second: Operation time more than 60 min. Third: any history of local anesthetic drugs sensitivity. Forth: Extensive intra-abdominal manipulations in case of sever gall bladder inflammation like abscess and phlegmon. Fifth: opium addiction or other drug abuse. Sixth: any history of other medical diseases.

For data analysis we used Chi-Square test which shows the significant difference between groups. We considered P less than 0.05 as a significant value.

Results

All 93 patients were divided into two groups. The pain of the control group was controlled using conventional medication (narcotics and NSAIDs) and group 2 was managed with local anesthetic pain killers. 85% of group 1 did not respond to NSAIDs alone and needed narcotics. The 15% of them responded just to the NSAIDs and did not need other medications. 65% of group 2 did not need any medication and their pain was relieved by only the LADs. Out of the remaining 35% of patients, 30% needed NSAIDs (Fig. 1).

For data analysis we used Chi-Square test which shows the significant difference between groups. We considered P less than 0.05 as a significant value. The results showed there was a statistically significant relationship between the groups tending to ask for sedatives (Chi–Square=63.187, df=2, $p<0.0001$). Our data in table-2 shows that the complication rate is statistically less in group two (Table 1). LADs don't have sedative effects and patients in this group were ambulated earlier (average 3.5 hr) post-operatively when compared with the control group (Average 6.5 hr.) The First post-operative request for analgesic by patients in control group and patients in treatment group which did not respond to LADs, was 1 hour and 4 hours, respectively. For each patient in control group, elapsed time for preparation of narcotics and close monitoring for their side effects after administration by the nurses, was about 30 minutes. In the treatment group we did not have this waste of time.

Fig 1. Distribution of analgesics administration

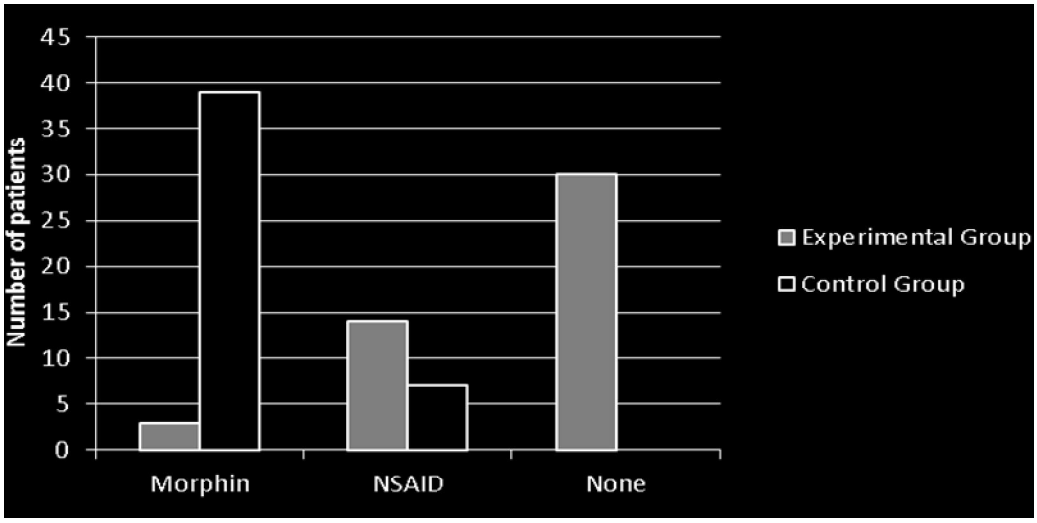

Table 1. Statistical evaluations of complication related to local anesthetic drugs

Complications	Group 1	Group 2	Odd Ratio (1.00/2.00)	CI95%	P value
	Number (%)	Number (%)			
Nausea & vomiting	25(54.3%)	7(14.9%)	16.034	2.526-18.320	0.000
Drossiness	39(84.8%)	5(10.6%)	46.800	13.712-159.732	0.000
Weakness	33(71.7%)	15(31. 9%)	5.415	2.229-13.157	0.000
Itching	10(21.7%)	0(0.0%)	0.783*	0.672-0.911	0.000
Headache and light headedness	28(60.9%)	2(4.3%)	35.000	7.540-162.472	0.000

Discussion

All surgeons know the efficacy of the narcotics in pain relief but a wide variety of side effects; push them to think twice about the application of narcotics. As we know, narcotics have two kinds of side effects. First: severe and lethal complications such as: confusion, respiratory suppress, vomiting and weakness. These are very important and magnified complications in the post-operative period. Second: minor complications: constipation, itching, mouth dryness and etc. At a glance these complications induce a wrong idea in medical staff that having pain is better than severe complications and they prefer the patients to have a painful post-operative period rather than getting an unwanted complication. If any modality can be found that has the capability of pain control with no severe side effects, it will be more practical and safer than the conventional method.

Results demonstrate that a high rate of patients of the treatment group well responded to the local anesthetic drugs (65%) without any need to NSAIDS or narcotics. From the remaining, just 5% required narcotics administration and the pain of 30% of the patients was controlled with NSAIDs. The control group shows very different results that are clinically and statistically important to the group two. In this group more than 85% of patients require narcotic administration and just 15% of patients' pain was controlled with NSAIDs alone. The high rate of narcotic administration in control group has shown many of drugs' side effects such as: nausea, vomiting, weakness, drossiness, itching, headache and light headedness that are very bothersome for patients.

Local anesthetic drugs, if used with a proper method and in the right conditions, can decrease the need for narcotics in some conditions and eliminate the need to them in other situations [3]. This is one of the main strategies for decreasing the side effects of narcotics.

In a study in Italy, Cantore F and et al showed that pre-incision local infiltration with levobupivacaine reduces pain and analgesic consumption after laparoscopic cholecystectomy [7]. Another investigation has shown [8] that intra-operative infusion of Lidocaine reduces postoperative Fentanyl requirements in patients undergoing laparoscopic cholecystectomy. With the use of LADs for post-operative pain control the time of the first administration of narcotics or NSAID was delayed considerably [8, 9]. In advanced and prolonged laparoscopic surgeries, inserting a catheter inside the wound and the continuous infusion of local anesthetic drugs can decrease narcotic use and the length of hospitalization [9]. The intravenous infusion of Lidocaine pre- and post-operatively can not only decrease the post-operative pain but also can decrease the hospital stay time and costs [10]. Intra-peritoneal injection of LADs is useful for decreasing post-operative pain and reducing narcotic use and their side effects [11]. Due to the pain killing effects of the LADs, many hormonal changes were observed, some of which may be useful. Decreased plasma level of the cortisol can reduce the length of inflammatory processes [12].

There are many papers that do not support this study and mention that this matter requires further extensive investigations. For example in a study, [13] the application of placebo-controlled comparison of local anesthetic and NSAIDs for postoperative pain management after laparoscopic surgery, has shown no difference between them and none of them can control the post-operative pain properly. In another investigation [14] LADs were not able to reduce post-operative pain

significantly in mini-laparoscopic surgeries in children and young adults.

At a glance, there are many significant benefits that can be considered for LADs being used for pin control:

1) It can reduce nursing duties and cause significant decrease in costs;
2) They have fewer side effects than the narcotics and NSAIDs;
3) Their effectiveness is comparable with narcotics and NSAIDs;
4) They don't have sedative effects and this can lead to earlier and complete ambulation of the patients that is very useful (decrease pneumonia, deep vein thrombosis…);
5) Postponing the time of the first postoperative request for narcotics and NSAIDs.

Conclusions

Instillation of LADs through laparoscopic ports at the end of laparoscopic surgeries not only can control the pain effectively but also can decrease the need for narcotics and NSAIDs. They are recommendable in the post-operative phase for all laparoscopic surgeries without any limitations. Patients feel better because of decreased narcotics side effects.

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