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Comparison of Post Operative Sedation between Ultrasound Guided TAP Block with the Standard Post-Operative Analgesic Regimen

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Abstract

Introduction: From its humble beginnings, ultrasound guided regional anaesthesia has evolved over the years, with the development of newer blocks and alternative approaches to existing peripheral nerve blocks. Therefore it finds application in not only the anaesthesia set-up but also in critical care and trauma triages, as a modality to provide anaesthesia and analgesia to patients. It is currently the standard of care for administering regional anaesthesia.

Methodology: The patients were selected by convenience sampling and those who matched the selection criterion, were briefed about the nature of the study and the procedures involved, in a language understood by them and written informed consent was taken. Descriptive data of the patient such as name, age, sex and detailed medical history, was collected.

Results: In our study it was observed that some patients in both Groups S and T experienced mild sedation (Ramsay Sedation Score 3) when assessed for the same at the 2 hour and 4 hour interval. The number of patients experiencing mild sedation at these intervals, were more in Group T as compared to Group S.

Conclusion: But this difference in Sedation scores between the two groups was not found to be statistically significant (p value> 0.05). At the subsequent intervals of 6, 12 and 24 hours, there was no difference in the incidence of sedation between the two groups.

Keywords: Post Operative Sedation; TAP Block; Post-Operative Analgesic Regimen.

Introduction

Peripheral nerve block is a technique of administering anesthesia and analgesia to patients, where the nerves supplying the area of interest are blocked by deposition of local anaesthetic agent around them. While administering a peripheral nerve block, the goal is to ensure optimal distribution of local anaesthetic around the targeted nerve or plexus.[1]

Prior to the advent of ultrasound, peripheral nerve blocks were administered by surface anatomy "landmark" techniques. This technique was fraught with complications such as inadequate blockade of nerves, trauma to the surrounding soft tissue, vascular and neural damage. The shortcomings of the blind approach were overcome with the development of nerve stimulators, which helped the practitioner to identify the target nerve by stimulating it and observing the response elicited. But this technique too was fraught with shortcomings such as inadequate nerve blockade and damage to the nerves as a result of direct

puncture.[2]

With the advent of ultrasound, it was possible to overcome the shortcomings associated with the landmark and the nerve stimulator techniques. Ultrasound imaging of the anatomical structures enabled practitioners to ensure optimal needle positioning and thereby safely administer regional anaesthesia. Since the blocks are administered under vision, the volume of drug used could also be significantly reduced, thereby reducing the risk of local anaesthetic toxicity.[3]

In 1880, Pierre and Jacques Curie discovered the piezoelectric effect in crystals. A student of Pierre Curie, Paul Langevin, subsequently developed piezoelectric materials which had the capability to generate as well as absorb mechanical vibrations with high frequency. Thereafter, ultrasound found application in the navy to detect enemy submarines. In 1942, the clinical utility of the ultrasound as a diagnostic tool was discovered by Karl and Friedrich Dussik. It was also utilised to treat patients suffering from Meniere's disease, Parkinson's disease and rheumatoid arthritis.[4]

It was only in 1978, that ultrasound was utilised for the administration of peripheral nerve blocks. P. La Grange et al., used a Doppler transducer to perform a supraclavicular brachial plexus block. In 1989, P. Ting and V. Sivagnanaratnam extensively studied the utility of the B mode ultrasonography to visualise the axillary anatomy and to observe thespread of local anaesthetics in the axillary brachial plexus block. Stephen Karpal and colleagues conducted extensive studies on the brachial plexus block using the B mode ultrasound.[5]

From its humble beginnings, ultrasound guided regional anaesthesia has evolved over the years, with the development of newer blocks and alternative approaches to existing peripheral nerve blocks. Therefore it finds application in not only the anaesthesia set-up but also in critical care and trauma triages, as a modality to provide anaesthesia and analgesia to patients. It is currently the standard of care for administering regional anaesthesia.[6]

Methodology

Study population: Patients undergoing total abdominal hysterectomies.

Study design: This was a prospective, single blinded, randomized comparative study.

Sample Size: Considering a mean difference of the rescue analgesic used in the standard and TAP group and standard deviations of 19 and 18 respectively, with 5% error and 99% power, the minimum required sample size was 26 per group. For the sake of consistency in the results the number of patients included in each group was 30.

Assumptions:

a) The outcome variable is continuous.

b) The sampling distribution of the sample mean is approximately normal.

c) The observations are independent.

Duration of study: Two years (December 2016-November 2018).

Inclusion criteria:

a) ASA-I and ASA-II patients.

b) Patients undergoing total abdominal hysterectomies.

c) Patients in the age group of 18-70 years.

Exclusion criteria:

a) Patients allergic to bupivacaine.

b) Patient with bleeding or coagulation disorders.

c) Patients undergoing emergency surgeries.

The patients were selected by convenience sampling and those who matched the selection criterion, were briefed about the nature of the study and the procedures involved, in a language understood by them and written informed consent was taken. Descriptive data of the patient such as name, age, sex and detailed medical history, was collected. They were randomized into two groups with the help of computerized randomization software. The groups were:

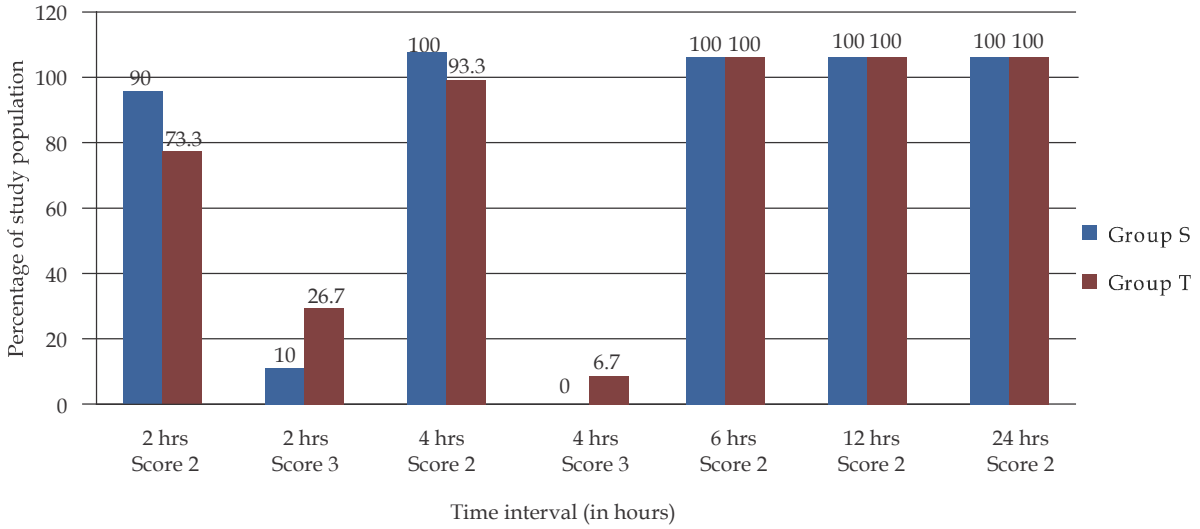
I. Group S: Standard regimen group: The patients in this group received the standard post-operative analgesic regimen of intravenous paracetamol 1 gm every 8th hour following the surgery.

II. Group T: TAP block group: Patients in this group received post-operative ultrasound guided TAP block with 0.25% bupivacaine as the analgesic modality.

Results

Table 1: Mean Age of patients in the two study groups.

	Group		P Value
	Group S (n=30) Mean (SD)	Group T (n=30) Mean (SD)	
Mean Age (in years)	45.87 (7.22)	43.93 (6.07)	0.267



Graph 1: Comparison of Sedation scores between the two study groups.

Unpaired t Test, P Value Not Significant.

In our study, there was no statistical difference in the mean age of the patients in Group S (Mean: 45.87 years) and Group T (Mean: 43.93 years) (p value: 0.267). (Table 1)

Table 2: Comparison of ASA grade distribution between the two study groups.

ASA Grade	Percentage of study population		P Value
	Group S (n=30) n (%)	Group T (n=30) n (%)	
1	16 (53.3)	17 (56.7)	0.795
2	14 (46.7)	13 (43.3)	

Chi-Square Test, P Value Not Significant.

In our study, there was no statistically significant difference in the ASA grading distribution of patients between Group S (ASA 1: 53.3%; ASA 2: 46.7%) and Group T (ASA 1: 56.7%; ASA 2: 43.3%) as the p value is 0.795. (Table 2)

In our study it was observed that some patients in both Groups S and T experienced mild sedation (Ramsay Sedation Score 3) when assessed for the same at the 2 hour and 4 hour interval. The number of patients experiencing mild sedation at these intervals, were more in Group T as compared to Group S. But this difference in Sedation scores between the two groups was not found to be statistically significant (p value> 0.05). At the subsequent intervals of 6, 12 and 24 hours, there was no difference in the incidence of sedation between the two groups.(Graph 1)

Discussion

Using the Ramsay Sedation Scale the sensorium of patients in Group S and Group T was assessed and evaluated. In our study it was observed that some patients in both the groups experienced mild sedation (Ramsay Sedation Score 3) at the 2 hour and 4 hour interval. Thereafter none of the patients in either group experienced any sedation or drowsiness (Ramsay Sedation Score 2). There was no statistically significant difference in the sedation scores of patients in the two groups (p value> 0.05).

Sivapurapu V et al.,[7] conducted a randomized controlled trial to compare theanalgesic efficacy of the TAP block with direct infiltration of local anaesthetic into surgical incision in patients undergoing lower abdominal gynaecological surgeries. The incidence of sedation was assessed in both the groups at regular intervals, post-operatively. It was found that there was a significant reduction in sedation scores in the group receiving TAP block at 2 (p value: 0.001) and 4 hour intervals (p value: 0.003). Thereafter sedation scores were comparable between the two groups. These findings could be due to the higher demand for rescue analgesia (morphine 0.1 mg/kg bolus, followed by morphine PCA) in the group receiving infiltration, in the early post-operative intervals. In our study, patients in both in both Group S and Group T experienced mild sedation at the 2 and 4 hour interval, but there was no statistically

significant difference in the sedation scores between the two groups. This could be attributed to the sedative effects of intrathecal buprenorphine used in the present study. Thereafter patients in both the groups had no complaints of sedation. This could be due to the lack of usage of opioids as rescue analgesics or as a part of the standard analgesic regimen and the wearing off of the effects of buprenorphine.

Bharti et al.,[8] compared the analgesic efficacy of a novel approach to TAPblock with controls, in patients undergoing colorectal surgeries. Patients in both thegroups were assessed for sedation scores at regular intervals, post-operatively. It was found that the sedation scores were significantly lower in the TAP block group at 2, 4, and 6 hours (p value < 0.05). Thereafter the results were comparable between the two groups. The reason for the higher sedation scores in the patients of the control group, in the early post-operative intervals could be due to the higher demand of the rescue analgesic, morphine. In our study, the sedation scores were comparable at the early post-operative time intervals whereas, the patients in both Group S and Group T were asymptomatic in the later intervals. This was due to the use of buprenorphine, which produced comparable sedation in patients of both Group S and Group T at 2 and 4 hour intervals. The absence of any sedation in patients of both the groups at subsequent time intervals was due to the wearing off of the effects of buprenorphine and the absence of opioids in the standard analgesic regimen as well as the rescue analgesic plan.

Kanazi et al,[9] compared the analgesic efficacy of sub arachnoid morphine with thatof TAP block in women undergoing Caesarean sections. Sedation scores of patients in both the groups were noted at regular intervals, post-operatively. It was found that the sedation scores were comparable at all post-operative time intervals assessed (less than or equal to 2), between the two groups. The reason for comparable sedation scores in both the groups could be due to the low dose of morphine used in the sub arachnoid block. In our study, the sedation scores were comparable at the 2 and 4 hour intervals. At the subsequent intervals patients in both Group S and Group T did not experience any sedation. This was because patients in both the groups received intrathecal buprenorphine, resulting in comparable sedation scores in the early post-operative intervals. Thereafter, due to the wearing off of the effects of intrathecal buprenorphine, patients in either group did not experience any sedation.

In a meta-analysis conducted by Mishriky B M. et al,[10] to evaluate the efficacy of the TAP block in providing analgesia in women undergoing Caesarean sections, incidence of sedation was evaluated. In the sub analysis comparing TAP blocks with controls in patients who did not receive intra-thecal morphine, it was noted that there was no significant difference in sedation scores between the two groups. Even in patients who had received intra thecal morphine, it was noted that there was no significant difference in the sedation scores when compared to the TAP block group. The findings of our study with respect to sedation scores are in concurrence with the findings of the above meta-analysis.

In the meta-analysis conducted by Abdallah F W et al,[11] to assess the relative analgesic efficacies of the posterior and lateral approaches of the TAP block, the sedation scores of the patients were assessed. It was found that when compared to the controls, there was a significant reduction in sedation scores at the 24 hour interval in patients who had received the TAP block by the posterior approach. No such difference was observed at the 24 hour interval, in the patients who had received TAP block by the lateral approach, when compared to controls. In our study the sedation scores of patients in Group S and Group T were comparable in the early post-operative intervals due to the use of intrathecal buprenorphine. At the subsequent intervals patients in both the groups did not have any sedation. This is similar to the results of the aforementioned meta-analysis.[12]

Since sedation scores are a function of the timing of the rescue analgesia, dose of analgesic administered and the nature of the analgesic used (opioid or non-opioid), there can be heterogeneity in the sedation scores observed in the patients.

Conclusion

Mild sedation was present in patients of both Group S and Group T at the 2 and 4 hour interval, but the sedation scores were comparable between the two groups. At the subsequent time intervals, patients in both the groups did not experience any sedation.

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