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A SIX-MONTH EXPERIENCE OF PROSPECTIVE RESEARCH ON THE PENTAZOCINE, BUPRENORPHINE AND TRAMADOL EFFECT ON OPIOID ALLERGIC ASA I & II PATIENTS UNDERGOING CAESARIAN SECTION

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Abstract:
Objective: *Evaluation of the effects of Buprenorphine, Pentazocine and Tramadol on Respiration.*
Study design: *This study is prospective.*
Place and duration of study: *The study at hand was carried out in the month of July to December 2017. Intensive Care Unit (ICU) of Mayo Hospital, Lahore was the place of this study.*
Patients and methods: *Total 60 patients related to ASA-I&II grades undergoing elective cesarean section were selected. Their age groups range from 18-35 years. Patients allergic to Opioids and those who were having severe systematic diseases not falling in ASA 1 or 2, were not considered in the study. Non-probability convenience sampling technique was used. Selected patients were divided into 03 groups. Twenty patients were allocated to every group. Endotracheal general anesthesia was administered to all the patients. Following operation, injection Buprenorphine 0.5mg IM was received by Group "A", Pentazocine 30mg IM was received by Group "B" and Tramadol 100mg IM was received by Group "C". After giving analgesia, its effects on arterial blood gases, tidal volume, minute volume and respiratory rate, were observed after half an hour, an hour, two hours and four hours. Repetition of the doses was performed eight-hourly.*
Results: *After thirty minutes, respiratory rate and minute volume were seen to be decreasing in case of Buprenorphine. Effect of Pentazocine was dissimilar as it decreased minute volume in five minutes and decrease of respiratory rate was in thirty minutes. However, Tramadol has neither affected respiratory rate nor minute volume. Buprenorphine and Pentazocine decreased PaO2 within thirty minutes. The rise of PaCO2 was seen after one hour with Buprenorphine, whereas Pentazocine raised the same within five minutes. No changes were seen in arterial blood gas values with Tramadol.*
Conclusion: *Opioids possess a respiratory depressant effect which is observable from thirty to sixty minutes of IM administration. In contrary, in equal-potent doses, respiratory depression is not caused by Tramadol being a non-opioid.*
Keywords: *Parenteral, Buprenorphine, Pentazocine, Tramadol, Blood Gas Analysis, Respiration, Analgesia, Buprenorphine, Blood Gas Analysis, Buprenorphine and Recovery room.*

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INTRODUCTION:

After operation of a patient, pain is inevitable and thus needs to be treated immediately. Pain is an unpleasant sensory and emotional expression. It may be linked with actual or potential damage of tissue. Severe discomfort, autonomic changes, fear, reflex activity and suffering are hallmarks of pain. To cure pain, both pharmacological and nonpharmacological methods are in vogue. History of using opioids for pain relief goes back to ancient times. In about 300 BC, Greek people used these opioids in medicines with remarkable results. opioids analgesics are thought to be the gold standard even after the emergence of newer agents nowadays. Conventionally, opioids are either administered intramuscular or intravenously. Undoubtedly, these routes are hurting and have adverse effects. In abdominal-thoracic surgery, they create ineffective analgesia. These routes neither demand costly equipment nor qualified anesthetist. The study at hand was conducted at Mayo Hospital, Lahore (ICU). The objective of the study was to compare and contrast the respiratory depressant effects of Pentazocine, Tramadol and Buprenorphine, in equiv. analgesic doses.

PATIENTS AND METHODS:

Hospital Ethics Committee approved this study. We selected sixty healthy un-pre-medicated parturient after acquiring informed consent. They were aged from 18 to 35 years. These parturient were undergoing elective lower segment cesarean section. Patients allergic to Opioids and those who were having severe systematic diseases not falling in ASA 1 or 2, were dropped in the study. Rapid sequence induction was carried out with injection 2.50 percent thiopentone four-eight mg/kg, suxa-methonium 1.50 mg/kg intravenously. Injection atracurium 0.30 mg/kg was given with increments of 0.1-0.2mg/kg intravenously as per requirement. Till the delivery time, with fifty percent nitrous oxide and 0.20-0.50 percent halothane in oxygen and after the delivery, with sixty percent nitrous oxide in oxygen +0.20-0.50 percent halothane, anesthesia was maintained. Once the surgery was over, injections atropine1.20 mg and neostigmine 2.50 mg were administered intravenously as per requirement. Patients were admitted to ICU when the operation suction was carried out under vision and endotracheal tube was removed. Allocation of patients to 03 groups was done randomly. Administration of freshly prepared analgesics was done randomly. Pentazocine 30 mg was given intramusintramuscularly to patients related to group 'A'. Buprenorphine 0.30 mg was given intramuscularly to Group 'B' patients. Tramadol 100mg was given intramuscularly to the patients of Group 'C'. These patients were kept in ICU for twenty-four hours. They were administered analgesics intramuscularly with the gap of every eight hours. Patients were remained in Intensive Care Unit because it provides ventilators in case of emergency as opioids tend to have a tendency of strong potential for respiratory depression.

Vital signs i.e. blood pressure, respiratory rate pulmonary function monitoring, rate of pulse, duration of analgesia and evaluation of pain-onset of analgesia, were recorded in Postoperative follow up. Recording of conscious level (drowsy or awake), and side effect were also part of Postoperative follow up. Bioscope was used to monitor arterial blood pressure, ECG and Pulse rate.

Data scope monitored the end tidal CO2 occasionally. Observance of O2 saturation was carried out with pulse oximeter. Wright's Spiro meter was utilized to monitor both forced vital capacity and minute volume. Wright peak flow meter was used to observe peak expiratory flow rate. After the end of injection, these readings were noted at five minutes, thirty minutes, and an hour. For twenty-four hours, the same was done after four hours. Wright's Spiro meter was used to calculate minute volume and Respiratory rate readings for over three minutes. In every patient, severity of respiratory depression and the time of beginning were recorded. Assessment of pain was recorded on a vertical scale, the bottom of which indicated 'Zero'. Alphabet '0' indicated the absence of any pain and thus allowing the patient to walk around and sit in a bed comfortably. Alphabet 'three' was an indication for moderate pain in which pain was observed during movements of patients whereas alphabet 'five' demonstrated unbearable pain. When patients were observed to be slept, score 'Zero' was awarded. Assessment of pain intensity was performed instantly before the drug intake. After epidural injection, starting time of analgesia was recorded. After that, pain was assessed after four hours. Recording of time duration of analgesia for each dose was made ensured. The side effects like nausea, vomiting, pruritus etc. were recorded too. The evaluation of degree of sedation on a four-point scale was also endeavored.

RESULTS:

After thirty minutes, respiratory rate and minute volume were seen to be decreasing in case of Buprenorphine. Effect of Pentazocine was dissimilar as it decreased minute volume in five minutes and decrease of respiratory rate was in thirty minutes. However, Tramadol has neither affected respiratory rate nor minute volume. Buprenorphine and Pentazocine decreased PaO2 within thirty minutes.

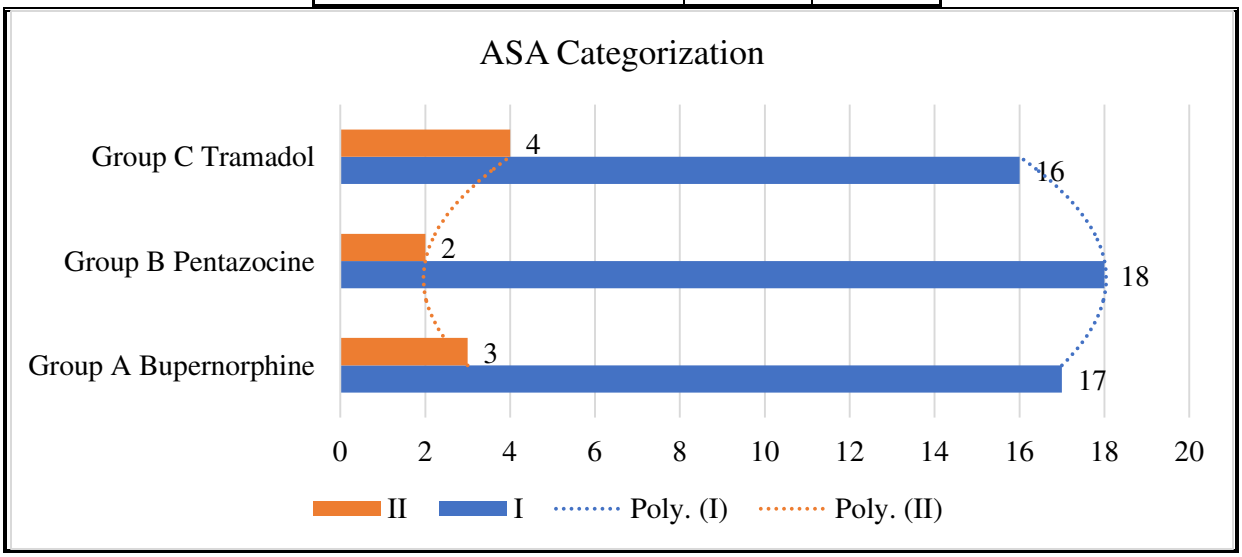
The rise of PaCO2 was seen after one hour with Buprenorphine, whereas Pentazocine raised the same within five minutes. No changes were seen in arterial blood gas values with Tramadol.

Table-I: Demographic Data

Description	Group A	Group B	Group C
Number of patients (Female)	20	20	20
Age (Years)	25 ± 2	26 ± 1	23 ± 3
Weight (kg)	55 ± 8.5	50 ± 10.7	52 ± 9.5

ASA Categorization

ASA Grade	**I**	**II**
Group A Buprenorphine	17	3
Group B Pentazocine	18	2
Group C Tramadol	16	4



DISCUSSION:

The purpose of the study was to distinguish amongst three analgesics in terms of their minimum effects on arterial blood gases and respiration

Respiration:

Dose related respiratory depression is caused by Buprenorphine. Other narcotic agonist antagonists' drugs a plateau and ceiling have also been explained in relation to Buprenorphine [1]. Pentazocine is akin to morphine in its analgesic effects. It can be used to relieve of moderate to severe pain. Thirty milligrams of its dose are similar to the ten milligrams of morphine dose. This drug has the same effect on respiratory depression as some other opioids with equiv. analgesic doses have [2]. When the dose of Pentazocine is given more than 30 milligrams, it will not create any further similar rise in respiratory depression. Resultantly, doses response curve is found to be plateau shaped. Table-II: Comparison of effects on Respiratory System.

As per other medical researches, it was noted that respiratory depression caused by Pentazocine achieves maximum level at sixty milligrams in an adult with a weight of seventy kilogram [3].

It is must be remembered that monitoring of patient for apnea and respiratory depression must be ensured which cannot be reversed either by levallorphan or nalorphine but by naloxone. Our study indicated that reduction in minute volume and respiratory rate was observed with the use of Buprenorphine and Pentazocine. The degree reduction of respiratory rate and minute volume was more with Pentazocine as compared to Buprenorphine. Four other laborers [4] also confirmed this characteristic about Pentazocine. However, results do not match with other researchers when changes occur in respiratory rate after thirty milligram Pentazocine [5]. After intravenous injection, maximum depressant effect of morphine like analgesics was observed to be about 05 minutes. However, we were not fully sure of this. The only exceptional case was with Tramadol that it did not

change minute volume and respiration rate after intake of 100 milligram. This was the same result which was adjudged by other researchers [6].

Arterial Blood Gases -PO2:

The alteration occurred in arterial oxygen partial pressure cannot be set as objective criteria. We can predict certain tendencies since standard deviation was found enormous in many cases. Two drugs caused increase in arterial PO2 with the exception of Pentazocine (05 and 30-minute values). arterial PO2 decreased to 95.60 percent of control value after intake of thirty milligram Pentazocine. Different interpretation can be made in the case of increase in PO2. The patient group who were suffering from various traumas and had undergone surgery, instability in pulmonary function and pain related hypoventilation were noted. Lower minute volume and higher respiratory rate were found in connection with instability in pulmonary function. This paved the way to distribution disorders owing to less ventilation of patients' alveolar area. It, thus, resulted in micro atelectasis and right to left shunt [7]. However, sufficient analgesia removes hypoventilation in multiple cases. Resultantly, oxygenation of the arterial blood was improved. In contrary, Morphine related analgesics decrease O2 requirements of the tissues and human basal metabolism. After intake of 0.30 milligram Buprenorphine and 30milligram of Pentazocine, changes in O2 consumption in 08 healthy subjects were seen. In this case, Buprenorphine reduced O2 consumption to a higher limit i.e. twenty to thirty percent as compared to Pentazocine (10 percent approximately). Another relative study was carried out amongst Piritramide, Pentazocine and Pethidine, in which arterial PO2 was decreased after the consumption of Pentazocine. However, arterial PO2 was increased with Pethidine and Piritramide. Decline in O2 pressure and content after administration was observed in another conducted study. No other worker observed any obvious decline in O2 consumption after Pethidine, Pentazocine and morphine [8]. After intravenous intake of Piritramide, an obvious increase in the O2 content in mixed venous blood advocates better tissue perfusion. No other researcher has given a clue of obvious alteration in PaO2 even after high doses in case of Tramadol.

Arterial Blood Gases PCO2:

After administration of Buprenorphine and Pentazocine, an evident increase in arterial CO2 was noted. On the other hand, 2.5 percent rise in arterial CO2 with Tramadol was not apparent enough. Findings with Pentazocine indicates that the beginning increase in carbon dioxide partial pressure after 05 mins was much greater as compared to Buprenorphine. Nonetheless, it declined again more quickly. After Pentazocine, Respiratory depression was found somewhere else too. Increase in the beginning seems similar to Benzomorphans' which was also observed with Pentazocine. Consequently, equal-analgesic doses of Pentazocine do not have significant merits or demerits over Buprenorphine. Similar respiratory depressant effects were observed with 30 milligrams of Pentazocine and 10milligram of morphine. Nevertheless, with increasing intakes of Pentazocine, the rise in respiratory depression is lesser and not comparative. It was authenticated by others too. As far as changes in PCO2 after Pentazocine are concerned, they are totally conflicting. In some cases, distinctive increase in PaCO2 was reported while in some others, no obvious alterations were observed. Our findings match with others in the matter of the effect of respiratory depressant with equal-analgesic intakes of Pentazocine and Buprenorphine. Only Tramadol showed no effect on PCO2 among other analgesics. With greater intakes of Tramadol, the same results were concluded somewhere else. In short, Tramadol is an analgesia which has a fewer negative effects on respiration.

CONCLUSION:

After the study, following conclusions were made: -

1. Both Pentazocine and Buprenorphine decrease minute volume and respiratory rate however, Buprenorphine decrease these values less than Pentazocine. There was larger decline of PaO2 with Pentazocine.
2. Both Buprenorphine and Pentazocine enhanced arterial partial pressure of Carbon Dioxide however with increase intakes of Pentazocine, depressant effect was not in proportion because of ceiling effect. ventilatory depressant effect is dependent upon dose in case of many opioids yet the agonist antagonist agents assert to possess a ceiling effect.
3. Owing to its atypical system of action, Tramadol is a remarkable drug. It does not have any significant effect on respiratory depression. Nonetheless, risk of intra-operative understanding and the difficulty of nausea in clinically successful analgesic doses are some of its disadvantages.
4. Pentazocine and Buprenorphine have general adverse effects i.e. sedation, vomiting, nausea, respiratory depression and urinary retention etc. The same are not common in case of Tramadol.

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