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To study the efficiency of synergistic effect of Fentanyl and Bupivacain for pain management in Spinal Anesthesia for caesarean section.

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Abstract:

In surgical practice role of anaesthesia is very important. Without anaesthesia one cannot think to carry out any surgical intervention.

In ancient period also *Sangyanasha* had very importance before initiating any *Shastrakarma*. *Acharya Sushruta* have also mentioned the importance of preoperative management which reduces patient's stress and anxiety by various methods. In ancient period also specific preoperative management to reduces surgical painful stimuli and to keep patients calm by reducing their anxiety had mentioned by Acharya Sushruta. Laghu Ahara & Tikshna Madya were anaesthetic modalities in that period which produces amnesia as well as preventive measures to avoid shock. Also few references of uses of Ayurvedic drugs like Bhanga, Ahiphena for producing narcosis are also described in ancient Ayurvedic classics.

Here we are going to study the efficiency of synergistic effect of Injection Fentanyl and Injection Bupivacain in Spinal Anesthesia for caesarean section. In caesarean section the main goal of the physician is to control the labour pain of the patient and to conduct the painless labour, as it helps to prevent so many complications during this procedure. During the procedure of caesarean section, there are chances of perioperative hypertension and tachycardia due to the labour pain and anxiety which can be controlled with the synergistic effect of both of these injections namely, injection Fentanyl and Injection Bupivacain. Here we are going to study the mechanism of action of both of these drugs i.e. Injection Fentanyl and Injection Bupivacain in the pain management and related complications of the caesarean section.

Keywords:-

OPIOID, Agonist, Central Neuraxial block, Aminoamides, Perioperative, sensory Block, Motor Block, Intubation, Laryngoscopy, Receptor, sedation, bradycardia, supraspinal analgesic

Introduction:

Injection Fentanyl is a synthetic OPIOID and is also a pure Agonist drug. Due to

high lipid solubility it has rapid onset (2-5min.) and also rapid recovery (1-2 hours) So it helps to improve the quality of action of injection Bupivacain during the procedure of the caesarean section. Injection Bupivacain is a local anaesthetic drug commonly used for the central neuraxial blocks especially for the caesarean section. Injection Bupivacain is an Aminoamides so very rarely cause any Allergic reactions during the procedures. Elimination half life of injection Bupivacain is 3.5 hours and it metabolized in liver. Injection Bupivacain is considered as the highly cardio toxic drug, because of which pain and anxiety during the procedure of caesarean section can worsen the cardiac function of the patient. Whereas injection Fentanyl can provides better cardiac stability due to which it's combination with the injection Bupivacain reduces the cardiac complications during the perioperative period as well as in postoperatively pain management also combination of these two drugs can act effectively.

Aim and Objective :-

Here we are going to study the efficiency of synergistic effects of injection fentanyl & injection bupivacaine for pain management in spinal Anaesthesia for caesarean section.

In perioperative pain management OPIOIDS plays an important role because of their ability of sudden onset and rapid recovery. Especially Injection Fentanyl is very effective for preventing stress response to the surgical procedure, intubation and laryngoscopy. Particularly in caesarean section injection Fentanyl can be very effective for intra operative and postoperative pain management.

Also injection Bupivacaine is considered as the local anaesthetic of choice for painless labour because of it's wide differential sensory and motor blockage which means motor block will occur only at high concentrations so, even if there is some error in dilution still there will be only sensory blockage.

Therefore here we are going to study the mechanism and also the efficiency of synergistic effect of both the injection Fentanyl and Injection Bupivacain in Spinal Anesthesia for caesarean section particularly for the painless labour.

Mechanism of action:

Injection Fentanyl is a Pure Agonist OPIOID and it considered as the agonist for all receptors namely,

- mu receptor
- kappa receptor
- Delta receptor
- Sigma receptor and
- nociceptin receptor

But it have most highest propensity for the ” mu receptor “

Through these specific receptors injection Fentanyl mediates mainly supraspinal analgesia, sedation, bradycardia, physical dependence. Out of which analgesia is the primary quality physician expected for conducting painless labour.

Injection Bupivacain is chemically a racemic mixture of S(levo) and R(Dextro) isomers. It is a very stable solution and available as 0.25% and 0.5%. The very unique property of injection Bupivacain which makes it local anaesthetic of choice for painless labour is it's wide differential sensory and motor blockage which means motor block will occur only at high concentrations so, even if there is some error in dilution still there will be only sensory blockage.

Systemic effect:-

Cardiovascular system -

Injection Fentanyl reduces the heart rates and mean arterial pressure but hypotension is minimum. Injection

Fentanyl provides a good cardiac stability whereas injection Bupivacain is considered as a highly cardio toxic drug. Cardiotoxicity of Bupivacain increased in pregnancy which is very hazardous thing. Cardiotoxicity of Bupivacain may manifest as Brady arrhythmias, conduction blocks, ventricular arrhythmia or cardiac arrest.

Central nervous system -

Injection Fentanyl causes minimum reduction in cerebral blood flow and intra ocular pressure. Cerebral oxygen consumption also reduces due to injection Fentanyl and intra cranial tension also variably minimized. It is also a good analgesic at both Spinal and supraspinal level. In the case of Bupivacain initial signs and symptoms of local anaesthetic toxicity are related to CNS (Central Nervous System). In this typical sequence of excitation followed by depression can be seen.

Respiratory system -

Injection Fentanyl causes minimum respiratory depression as compared to other less lipid soluble OPIOIDS. Injection fentanyl produce bronchial muscles constriction and also can produce significant muscle rigidity for e.g. wooden chest syndrome it also reduces ventilation but because of better stress response, it is a better drug for surgery as well as intubation and laryngoscopy.

Discussion:-

From all of the above points we can understand that injection Bupivacain have a unique property of wide differential sensory and motor blockage due to which it is considered as an anaesthetic of choice for labour but cardiotoxicity of bupivacaine may increase in pregnancy.

On other hand Fentanyl is considered as a cardiac stable drug and it is a very good analgesic drug having fast onset and also fast recovery.

As injection fentanyl is a Pure Agonist it improves the efficiency of injection bupivacaine also because of synergistic effect of the two medicine labour pain reduces effectively

Also because of addition of the injection fentanyl which provides cardiac stability cardiotoxicity of inj. bupivacaine became less effective.

Result:-

While considering the other cases with other patients who received only single drug therapy for pain management in labour period, we can found that synergistic effect of our both injections shown more effective than single drug therapy.

As injection fentanyl is a Pure Agonist it improves the efficiency of injection bupivacaine also because of synergistic effect of the two medicine labour pain reduces effectively

Also because of addition of the injection, fentanyl which provides cardiac stability cardiotoxicity of inj bupivacaine became less effective.

Conclusion:-

From all of the above observations we can conclude that synergistic effect of Injection Fentanyl and Injection Bupivacain is very effective for the pain management in Spinal Anesthesia for caesarean section as compared to single drug therapy.

As mentioned above injection Bupivacain have a unique property of wide differential sensory and motor blockage due to which it is considered as an anesthetic of choice for labour but at the same time cardiotoxicity of Bupivacain is seems to be increases more during pregnancy. That is why combination of Bupivacain with

Fentanyl can reduces this risk factor very effectively.
Also because of rapid onset and fast recovery procedure of caesarean section became painless & patient also tolerate the procedure well.
Also due to the pure agonistic property of injection fentanyl it improves the efficiency of injection bupivacaine because of which pain management during the procedure of the caesarean section became easier.

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