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Review Article

Disbiosis in the Digestive System: Faecal Transplant Therapy Revisited

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Abstract:

Irritable bowel diseases (IBD) collectively is an autoimmune intestinal disorder including ulcerative colitis (UC), Crohn's disease (CD), Irritable bowel syndrome (IBS), Celiac disease. In the present scenario, no permanent cure is available in therapeutics and the systemic treatment is being carried out to reduce the intensity of the disease. The age-old faecal transplant therapy (FMT) has been tried in animal models as well as human trials to find out whether promising results are obtained since, laboratory findings confirm the dysbiosis of the gut microbiota in all these diseases. Till this date, FMT has been allowed to treat patients suffering with recurrent Closterdium difficil infection. In this review we discuss results of the experiments undertaken to confirm the efficacy of FMT to bring the technique in therapeutics for IBD.

Keywords: irritable bowel diseases (ibd); ulcerative colitis (uc); crohn's disease (cd); irritable bowel syndrome (ibs); celiac disease, rebiosis

Introduction

Pain is defined as "An unpleasant sensory and emotional experience associated with, or resembles, actual or potential tissue damage." as defined by international association for the study of pain (IASP). Any tissue damage by thermal injury, chemical injury, mechanical injury etc can cause pain sensation. As per the literature study there is much to learn about how and why different people feel pain in different ways.[1]

One of the most crucial part in the management of patient with maxillofacial trauma is to manage post operative pain and reduce hospital stay.[1] Post operative pain can be minimized by administering opioids drugs and non-steroidal anti-inflammatory drugs (NSAID'S). But opioids analgesics has shown increased risk of respiratory distress, drowsiness, nausea, vomiting and other medical and physical complications.[1]

To minimize such post operativel complications, the use of long-acting local anesthesia has been advocated by many researchers [1,2] which reduces the usage of opoid analgesia and NSAID'S.

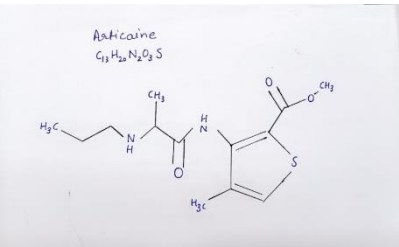
Articaine (Fig 1) is an amide type of local anesthetic agent with benzene ring and is available as 4% solution with 1:100000 epinephrine concentration.[2]. It was 1st synthesized by H. Ruschig, G. Ehrhart in Germany in 1969 and FDA approved it in april 2000. It is 1.5 times more potent than lidocaine and toxicity is equivalent to that of lidocaine.

Figure 1: Articaine hydrochloride 4% solution

Articaine is the only amide local anesthetic containing a thiophene aromatic rin. Because it also contains an ester group, biotransformation of articaine hydrochloride occurs in both plasma (hydrolysis by plasma esterase—similarly to other ester local anesthetics) and liver (hepatic microsomal enzymes—similarly to other amide local anesthetics).[3] It is excreted via

the kidneys (approximately 5% to 10% unchanged, approximately 90% metabolites).

Onset of anesthesia of articaine takes 1.5 to 1.8 minutes for maxillofacial infiltration and 1.5 to 3.6 minutes in mandibular nerve block.PH of articaine is 4.0 to 5.5 and anesthetic half-life is 0.5 hours (27 minutes). Articaine has both benzene ring and theophylline ring in its chemical structure (Fig 2) which makes it more soluble in lipids and well tolerated to tissues. [2,5]



Worldwide, articaine is the second most used dental local anesthetic agent.[3]

Articaine, is relatively contraindicated in patients with congenital or idiopathic methemoglobinemia, or in patients who are receiving treatment with methemoglobin-inducing agents because they are more susceptible to drug-induced methemoglobinemia.

Articaine hydrochloride with epinephrine is contraindicated in persons with known sensitivity to amide-type local anesthetics.

Administration of long-acting local anesthesia to children younger than 4 years is not recommended as long-acting local anesthesia may cause prolong anesthesia in lip, tongue and buccal mucosa, which child can bite unknowingly bite and cause self-harm.

Bupivacaine (Fig 3) is most widely used long-acting local anesthetic agent in maxillofacial surgery and obstetrics.

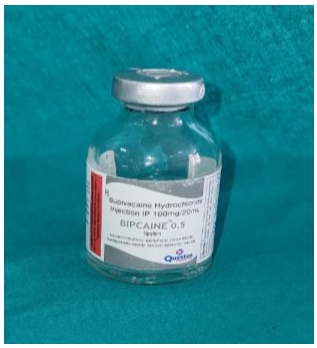


Figure 3: Bupivacaine 0.5% solution

Bupivacaine was first prepared by. A.F. Ekenstam, 1957 and FDA approved in October 1972. It is water soluble, amide type of local anesthetic agent with *Chemical formula.* 1-Butyl-2′,6′-pipecoloxylidide hydrochloride (Figure 4).

It also has solubility in lipids and higher protein binding properties make it suitable long-acting anesthetic agent. [3,5]

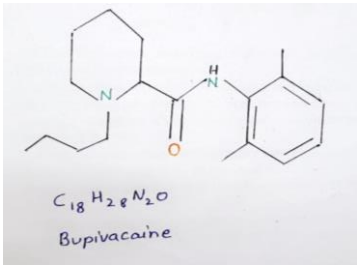


Figure 4: chemical structure of bupivacaine

It is Four times more potent that of lidocaine and its toxicity is less than four times that of lidocaine. It is Metabolized in the liver by amidases and Excreted Via the kidney; 16% unchanged bupivacaine has been recovered from human urine.

PH of plain solution. 4.5 to 6.0and pH of vasoconstrictor-containing solution. 3.0 to 4.5. Its onset of action is Slower than other commonly used local anesthetics (e.g., 6 to 10 minutes).

Effective dental concentration is 0.5%and anesthetic half-life is2.7 hours.

Bupivacaine is not recommended in younger patients (younger than 12 years in the United States) or in those for whom the risk of postoperative soft tissue injury produced by self-mutilation is increased, such as physically and mentally disabled persons. Bupivacaine with epinephrine is contraindicated in persons with known sensitivity to amide-type local anesthetics.

It is an appropriate long-acting local anesthetic drug to treat post-operative maxillofacial trauma cases due to its rapid onset of action and long-acting nature.

The mandible is innervated by the inferior alveolar nerve, a branch of the mandibular nerve (V3), which carries both sensory and motor fibers and exits the skull via the foramen ovale. A complete mandibular nerve block results in loss of sensation on the same side in the mandible, lower teeth to the midline, buccal and lingual soft and hard tissues, anterior two-thirds of the tongue, floor of the mouth, external auditory canal, anterior ear, jaw line skin, posterior cheek, and temporal region. The skin over the angle of the mandible remains unaffected, as it is supplied by the superficial cervical plexus. [6]

An inferior alveolar nerve block is effective for mandibular procedures like fracture repair or lower lip and teeth surgeries. Postoperative pain after facio-maxillary surgeries is often poorly managed, with common treatments like paracetamol, NSAIDs, and opioids offering limited relief. Regional anesthesia could enhance pain control and improve recovery out comes [6]

Inferior alveolar nerve block (IANB)

An inferior alveolar nerve block (IANB) is a dental procedure that provides anesthesia to the lower teeth, lip, and chin on epsilateral side of the mouth. It involves injecting a local anesthetic near the inferior alveolar nerve as it emerges from the mandibular foramen.

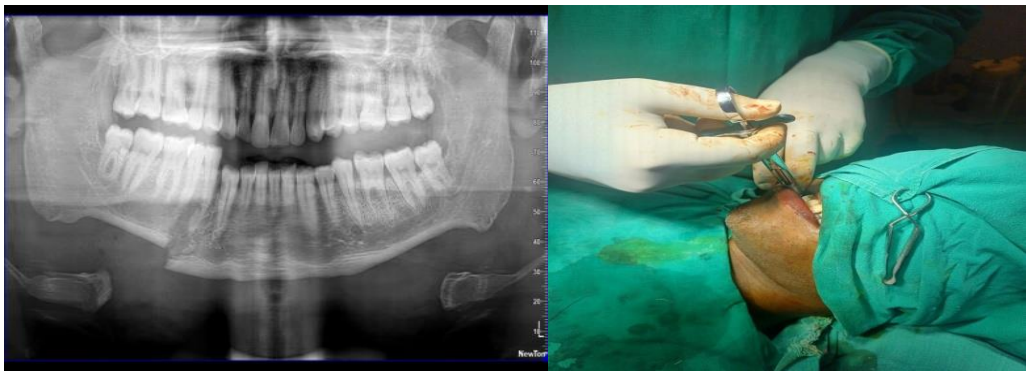


Figure 5.1 showing OPG of patient with right parasymphysis fracture undergoing ORIF under GA
Figure 5.2 showing inferior alveolar nerve block with 4% articaine post operatively by closed mouth (Vazirani-Akinosi) technique.

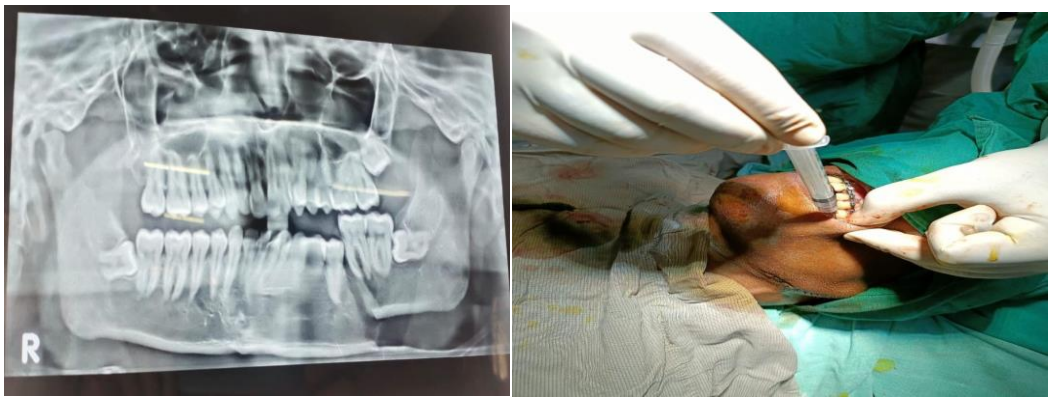


Figure 6.1 showing OPG of patient with left body fracture undergoing ORIF under GA
Figure 6.2 showing inferior alveolar nerve block with 0.5% bupivacaine post operatively by closed mouth (Vazirani-Akinosi) technique**.**

Discussion: -

In maxillofacial surgical cases the management of pain and other surgical and post-surgical complications are very important for early recovery of patient.

To manage post operative pain maxillofacial surgeons usually administer opioid analgesic or non-steroidal anti-inflammatory (NSAIDS) drugs.

While administering opoide analgesic, side effects like drowsiness, vomiting may be life threatening complication in those trauma patients where post operative maxillomandiubular fixation is required. [1,9]

Usage of NSAID'S post operatively, may cause GIT upset and other related complications.

Numerous studies have noted that a long-acting local anesthetic solution injected peri-operatively, following the fixation of a fractured bone, will provide good pain relief for the patient after surgery. [5]

The research has also noted a decrease in the use of rescue analgesics. Compared to lignocaine, long-acting local anesthetics such as bupivacaine and articaine have a longer duration of anesthesia due to their higher affinity for protein binding. [6,9]

These local anesthetic molecules cause temporary loss of sensory, motor, and autonomic capabilities when administered at pharmacological concentrations. [7]

The advantages of using articaine include its quick onset of action, minimal toxicity, good penetration, and short-term idolitic breakdown. In contrast, there have been reports of cardiotoxicity while using bupivacaine. This led to the introduction of levobupivacaine, the S (-) enantiomer of bupivacaine. [7,8]

In many studies such as Berkay-Tokuc et al reported the onset of action of articaine is much faster than bupivacaine, but the duration of post operative anesthesia was significantly higher in bupivacaine as compared to articaine.[8] This may be due to the metabolism of articaine which occurs both in plasma and liver.

Conclusion / Take home message:

1. Management of post operative pain and other complications is prime importance for operating surgeon.
2. Use of intra-operative long-acting local anesthesia reduces post operative intake of drugs like opioids or NSAID'S thus reducing the complication of these drugs.
3. Articaine is more effective in terms of onset of anesthesia and dosage.
4. Bupivacaine is more effective to control post operative pain because of its longer duration of anesthesia.

Conflict of interest: None

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