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A review on postoperative pain relief in women undergoing abdominal hysterectomy

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Abstract

One of the most common surgeries performed in women is abdominal hysterectomy. Effective postoperative pain management is a holistic method with cumulative efforts from surgeon, anesthetists, hospital staff and care giver. There are several approaches to provide adequate pain relief such as preemptive analgesia, regional and general techniques, multimodal analgesia and peripheral nerve blocks. The main objective of this review article is to be able to choose a modality of treatment from the present available strategies.

Keywords: postoperative, pain, abdominal hysterectomy

Introduction

Pain is one of the most common concerns after surgery. Treating post-operative pain efficiently is very important ^[1]. Pain in post-operative period ranges from moderate to severe after abdominal hysterectomy ^[2]. One out of ten women undergoes abdominal hysterectomy ^[3]. Pain following abdominal hysterectomy usually ends up in delayed recovery, late mobilization, increase in duration of hospital stay, increase chances of deep vein thrombosis chronic pain and most importantly patient dissatisfaction ^[4]. Nerve supply of urogenital tract is complicated; it consists of parasympathetic, sympathetic and somatic nerve supply. Pelvic organs are suspended by pelvic ligaments which are supplied by nervous plexus. Uterovaginal, pelvic and superior hypogastric supply the vagina, ovaries and uterus. But the pain experienced after an abdominal hysterectomy is mostly because of splitting the anterior abdominal wall. Supply of middle and lower wall of abdomen is from T10-T12 ventral rami of spinal nerves of lumbr plexus (ilioinguinal and iliohypogastric) ^[5]. Management of pain after surgery starts with adequate planning, good premedication, deep anaesthesia during surgery, and sufficient analgesia in the recovery period ^[6].

Neuraxial anaesthesia

Initially open abdominal hysterectomy was performed by administration of epidural as an adjuvant as a supplement to general anaesthesia. This epidural was activated in the post-operative period by administration of local anesthetics which act on sodium channels and in order to increase their efficacy and reduce the dosage additional adjuvants such as opioids can also be given with them ^[7]. Clinicians generally opt for bupivacaine 0.0625%-0.125% with additional fentanyl (2mcg/kg), other adjuvants such as tramadol (50mg), dexmedetomidine (0.5mcg/kg), butorphanol can also be given during surgery ^[8]. Usage of slow release morphine has been an advancement in postoperative pain relief after abdominal surgery, although adequate dosage requirement is not known because consumption of excess morphine has its downside such as respiratory depression, pruritis, and drowsiness ^[9]. Laparoscopic surgery cannot be performed by sole regional anaesthesia. However performing open abdominal hysterectomy under regional anaesthesia such as spinal and epidural is very likeable by the surgeons and highly convenient because of sufficient muscle relaxation when compared to general anaesthesia, advantages of regional anaesthesia such as reduce in requirement of post-operative opioid consumption and quicker normal bowel Movements ^[10]. Addition of morphine via the epidural space in young patients provides adequate pain relief in post-operative period for 24-47 hours ^[11] one of the recent advances in neuraxial anaesthesia is patient controlled epidural analgesia, the advantages and satisfaction produced is very much similar to IV PCA.

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This can be continuous epidural infusion or can be on patient demand as intermittent top up doses ^[12]. Administration of neuraxial morphine has a lot of adverse effects such as urinary retention (30% of cases), pruritis, respiratory depression, although chances of young patient developing respiratory depression after neuraxial morphine is slim. Patients do develop respiratory depression if administration of morphine occurs through a PCA pump or repeated doses. In general all women who undergo abdominal hysterectomy have urinary catheter in situ thus ruling out a significant mention of urinary catheter as a side effect ^[13]. In recent year recommendations were established for women who go through neuraxial anaesthesia to be monitored regularly, assessment ever hourly for patient who consume morphine and twice hourly for patients who take fentanyl. This assessment consists of 24 hours monitoring of oxygen saturation (spo₂), alertness and respiratory rate ^[14]. In three out of ten women Epidural anaesthesia is not adequate during surgery and in post-operative recovery period for pain relief ^[15], whereas spinal anaesthesia can provide 100% complete relief, its drawback being duration of action is limited (2 hrs maximum)

Regional / peripheral nerve blocks

Peripheral nerve blocks can be used as an adjunct along with neuraxial or general anaesthesia. Peripheral nerve blocks which can provide adequate pain relief in the post-operative period are TAP (tranversus abdominus plane block or ilioinguinal block ^[16], although ilioinguinal nerve block may not be sufficient in abdominal hysterectomy. TAP block is administration of drug mostly local anaesthetics which is deposited along an imaginary plane created between transversus abdominus muscle and internal oblique, tap block covers T10-L1 dermatomal level ^[17].

Administration of bilateral TAP block as post-operative analgesia for patients undergoing abdominal hysterectomy is a very good, safe, effective and easy mode of analgesia also reducing the requirement of opioids, but TAP block covers only the somatic part of surgical pain and not the visceral part so opting for multimodal analgesia is a good alternative ^[18]. Considering side effects of neuraxial blockade associated with age and the hemodynamic changes which occur after spinal and epidural, other alternatives for neuraxial blockade were searched upon which administration of intraperitoneal local anaesthetics or wound infiltration or both seem to be effective ^[19]. This technique had constricted success with ketamine and gabapentine. In recent studies Patient controlled intraperitoneal administration of local anaesthetics tends to have good pain control and also reduces opioid consumptions ^[20].

Multimodal analgesia

Different mechanisms of pain is targeted in multimodal analgesia, this is achieved by mixing drug from different analgesic groups, used effectively in trauma and post-operative pain, because its additive properties minimizes pain at low doses ^[21]. Multimodal analgesia has extensive Benefits such as - Reduced opioid related adverse effects, pain reduction is persistent, efficient pain control in immediate postoperative period, delay and reduced intake rescue analgesia, early mobilization and discharge ^[22].

Multimodal analgesic strategies also consist of fractions of bodily and social health interventions. Fast track hysterectomy method is yet another multimodal outlook

with effective collaboration between surgeon and anesthesiologist it consists of faster mobilization, early discharge, alleviate anxiety and pain ^[23].

Preemptive analgesia

Preemptive analgesia is yet another very important way to control post-operative pain ^[1]. Administration of analgesia even before starting of the surgery and its stimulus is known as preemptive analgesia, there are many efficient strategies in pain control when it comes to preemptive method ^[24]. Pain can be controlled more efficiently, rapidly and uninterruptedly. This is achieved by adequate serum level of the drug at the time of pain, that is possible only by giving the drug even before the onset time of pain ^[25, 26]. Preemptive analgesia consists of drugs such as paracetamol, opioids, local anaesthetics and NSAIDS, their mechanism of action is by increasing nociceptive threshold, decreasing nociceptive input and by deactivation of nociceptive receptors ^[27]. Patient controlled analgesia of morphine was effectively reduced in the postoperative period by offering paracetamol infusion before surgery ^[28]. Tramadol is a synthetic opioids acts on CNS (central nervous system). Its metabolites such as o-demethyltramadol is also considered to be an efficient opioid, it acts on mu receptors, serotonin and noradrenergic receptors (5HT_{2CR} receptors) and leads to secretion of serotonin, it also has less properties of respiratory depression when compared with other opioids, when given in combination with morphine through PCA (patient controlled analgesia pump), it provides excellent postoperative analgesia for abdominal hysterectomy ^[29]. Neuropathic pain which is chronic can be well controlled by anticonvulsant therapy, pregabalin and gabapentine which are anti-neuropathic drugs play a major role in controlling postoperative pain ^[30]. Gabapentine is a tolerable anticonvulsant agent which has less adverse effects when compared to opioids and has properties such as antiepileptic, anxiolytic and analgesic effects. Gabapentine is structurally very similar to GABA (GABA amino butyric acid), however its mechanism of action is unknown it rises the brain concentration of GABA ^[31] administration of tramadol and non-opioids such as gabapentine prior to surgery can effectively reduce the requirement of opioids (morphine and pethidine) in the post-operative periods ^[26].

Conclusion

From this literature review and our experience, we have found that effective pain management during and after abdominal hysterectomies are predicted upon prior planning of anesthesia. Use of general anesthesia alone does not allow flexibility in pain management; therefore, there is a preference for combining regional anesthesia or peripheral blocks with general anesthesia. In cases where there are contraindications preventing combined anesthesia, administration of opioids by PCA pump can improve analgesia with the disadvantage of added side effects. In most cases, regional anesthesia alone is sufficient and affords the benefit of neuroaxial opioids administration either as a single bolus or continuously. Effective pain management depends upon cooperation between the surgeons, anesthetists and the hospital's pain management service. It allows the implementation of the Fast Track Hysterectomy approach. Moreover, it is desired that each medical center periodically review its activity and results so that efficacy of treatment can be assessed and novel therapy

approached can be incorporated. It seems that other lower abdominal and pelvic surgeries not involving skeletal structures can benefit from the anesthetic approach described above, including vaginal hysterectomies, rectal surgery, and lower urinary tract surgery. Our department is currently researching these fields and we are waiting for the results in the near future.

Conflict of Interest

Not available

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Not available

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