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Preoperative Unrestricted Clear Fluid and Association with Postoperative Nausea And Vomiting: Review Article

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ABSTRACT

Background: One of the most distressing side effects of general anaesthesia is postoperative nausea and vomiting (PONV). Recovery room and hospital stay and overall health care costs can be increased by PONV. Reduced frequency of PONV is still significant even after the introduction of shorter surgical procedures, shorter acting anesthesias and newer anti-emetic medicines; many anti-emetic treatments are expensive and do not totally eliminate PONV with some adverse effects; yet. As a precaution against regurgitation and aspiration of stomach contents, pre-operative fasting reduces stomach volume and acidity. The current standards in Europe, on the other hand, advocate the consumption of oral clear fluids up to two hours prior to the onset of general anaesthetic induction. In order to limit the danger of regurgitation and aspiration, patients are advised to fast prior to general anaesthesia.

Objective: Review of free oral consumption of clear fluids before the anaesthesia and their effects on nausea and vomiting beyond surgery.

Methods: The databases were searched for articles published in English in 4 data bases [PubMed – Medline - Google scholar- science direct] and Boolean operators (and, or, not) had been used such as [Preoperative Clear Fluid, Postoperative Nausea and Vomiting] and in peer-reviewed articles between 2001 and 2021.

Conclusion: The incidence of postoperative nausea and vomiting was lowered when patients drank freely clear fluids prior to the scheduled induction of day case anaesthesia.

Keywords: Preoperative Clear Fluid, Postoperative Nausea and Vomiting.

INTRODUCTION

Anesthesiologists face one of the most difficult and major challenges in their practise when it comes to dealing with postoperative nausea and vomiting [(1)]. Within 24 hours of surgery, patients who experience nausea and/or vomiting in the post-anesthesia care unit (PACU) are said to have PONV (postoperative nausea and vomiting) [(2)].

These are the symptoms that follow an outpatient procedure's discharge and are known as "post-discharge nausea and vomiting" or "PDNV" [(3)].

Children are more likely than adults to experience postoperative vomiting, with some studies estimating that the incidence rate can reach as high as seventy percent [(4)].

Objective: Review of the preoperative clear fluid's role in preventing nausea and vomiting beyond surgery.

Methods:

A search strategy has been performed to determine the related literature. Review of free oral consumption of clear fluids before the anaesthesia and their effects on nausea and vomiting beyond surgery. Relevant keywords included: Preoperative Clear Fluid, Postoperative Nausea and Vomiting.

These databases were searched for articles published in English in 4 data bases [PubMed – Medline - Google search - science direct] and Boolean operators (AND, OR, NOT) had been used such as [Preoperative Clear Fluid, Postoperative Nausea and Vomiting] and in peer-reviewed articles between December 2001 and January 2021; a 20-year date range was selected, and no language limitations, and filtered in selected data basis for the last 20 years, however, the range of time interval for researches is wide as there's scarcity of data on the particular reviewed, accurate and depth in the retrieved literature. Documents in a language apart from English have been excluded as sources for interpretation was not found. Papers apart from main scientific studies had been excluded: documents unavailable as total written text, conversation, conference abstract papers and dissertations.

Postoperative nausea and vomiting (PONV) is the second common complaint with pain being the most common. We searched the online PubMed and Medline databases for articles published in English between 2001 and 2021 using keywords – postoperative nausea and vomiting, PONV, nausea-vomiting, PONV prophylaxis, and rescue. The review shows that the incidence of PONV is still unacceptably high despite a number of studies on PONV over decades, due to complex mechanism of PONV pathogenesis as well as relative lack of concern regarding this issue. PONV remains a significant problem in modern anesthetic practice because of the adverse consequences such as delayed recovery, unexpected hospital admission, delayed return to work of ambulatory patients, pulmonary aspiration, wound dehiscence, and dehydration.

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Evidence:

Anesthesia factors affecting PONV:

The risk of PONV in patients using regional anaesthesia is nine times lower than in those undergoing general anaesthesia [(5)].

Longer and more difficult operations call for tracheal intubation. Relaxation is almost always utilized to ease the process of intubation. Anesthesiologists frequently try to maintain spontaneous breathing during procedures in which the airways are secured using a laryngeal mask or merely a facial mask. Relaxed, intubated individuals, on the other hand, must be ventilated artificially. Unintentional distension of the stomach may result, particularly during anaesthesia induction [(6)].

Duration of anesthesia affecting PONV:

A 60 percent increase in the risk of PONV might be achieved by extending the operation by 30 minutes [(7)]. When inhalational anaesthetics are utilized and propofol is used, the incidence may rise or fall depending on the amount of opioids administered [(8)].

POV is more likely to occur in youngsters undergoing surgery lasting more than 30 minutes as opposed to those undergoing shorter operations [(9)].

Managing PONV, which can be difficult because of its many receptors and neurotransmitters that mediate the emetic response and because of its multi-factoral aetiology. While early detection and prevention are critical, so is early detection and prevention:

a. Aspiration, dehydration, electrolyte imbalances, and wound dehiscence are all possible side effects of PONV.

b. Many patients are concerned about PONV, which can cause substantial discomfort and unhappiness if it occurs during an anaesthesia.

c. PONV is a major cause of increasing hospital and patient expenses, both in terms of direct and indirect expenditures [(10)].

Decrease of the Baseline Risk Factors for PONV i.e. PONV protective anesthesia (in children and adults) [(11)]:

Reduction of base line risk in patients with medium and high risk for PONV via:

- Whenever possible, avoid general anaesthesia in favour of local or regional anaesthetics.
- Preparation for surgery and intraoperative hydration.
- Total Intravenous Anesthesia (TIVA) with Propofol.
- Avoiding anaesthetics that are volatile.
- Preventing nitrous oxide from being used.
- Assuring that you are not suffering from hypoxia, hypercarbia, or hypotension.
- Preventing the use of opioids during surgery. Post-operative opioids are more likely to produce nausea than intra-operative opioids.
- Using the least amount of neostigmine feasible.
- Postoperatively:
  - Using supplemental oxygenation (this reduces PONV by 50%).
  - Stomach deflation and aspirate blood from it.
- Minimal pharyngeal stimulation by repeated suction.
- Multimodal postoperative pain control including regional anesthesia, , Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), and other non- opioid adjuvant may reduce the need to opioid analgesics and so the risk of PONV.
- Avoiding sudden movements and change of posture during recovery [(11)].

Pre-operative clear fluids role in prevention Nausea and Vomiting

In order to minimise acute blockage of the respiratory system, aspiration pneumonia, and Mendelson syndrome under anaesthesia, routine pre-operative fasting is always administered before elective surgery [(12)].

When anaesthesia is produced, a fluid fast of no more than two hours has been proven to provide stomach circumstances that are at least established. However, some disadvantages have also been pointed up [(13)]. Benefits comparable to those of extended fasting intervals, with the added potential benefit of reduced residual volume [(14)].

On the other hand, studies have shown that depriving people, both adults and children alike, of fluids for an extended period of time causes severe emotional and physical suffering [(14)].

In certain cases, guidelines have tried to shift the emphasis away from a minimum length of fasting toward urging patients to forgo fluids for as long as necessary. Patients, on the other hand, frequently continue to fast excessively [(15)].

Fasting for a shorter period of time has numerous advantages. Shorter fasting periods have no effect on the amount of gastric residue or pH of the stomach. Improved patient well-being, reduced post-operative nausea, reduced risk of hypoglycemia/hypervolemia and smoother anaesthetic induction have been proven to be benefits of this technique [(16)]. In comparison to children who fasted for more than six hours, those who were offered fluids up to two hours prior to surgery reported less thirst and hunger, were more cooperative, and reported feeling less pain [(17)].

All kinds of anaesthesia, including procedural sedation, should follow the Canadian Anesthesiologists' Society's (CAS) fasting guidelines, which stipulate that the policies be tailored to the patient's age and any existing medical conditions [(18)]. The danger of aspiration of stomach content vs the risk of postponing surgery should be considered while doing urgent or emerging treatments. When determining the length of a fast, the type and amount of food consumed should be taken into account.

Prior to undergoing any type of elective surgery, fasting should be limited to a minimum of[19]:

- Approximately eight hours after indulging in a substantial amount of protein- or fat-rich cuisine.
- At the six-hour mark following a light meal (for example, toast without any fats).
- Infant formula, nonhuman milk, or expressed breast milk enriched with additives should be given six hours after consumption.
- After consuming breast milk for four hours.
- Adults should wait two hours after consuming clear fluids.
- For infants and toddlers, clear fluids should be consumed at least one hour afterward.

DISCUSSION

Postoperative nausea and vomiting (PONV) is not only common, it is one of the most distracting side effects following surgery / anesthesia. PONV has a major impact on the quality of care, but it also has an impact on the transfer of patients along the ambulatory pathway; delaying discharge and may result in unanticipated admission, and may also lead to a dehydration on rare occasions [20].

Postoperative nausea and vomiting (PONV) remains one of the most common adverse events after surgery. It is distressing for patients, increases the risk of other adverse events such as readmission. Nausea, vomiting, and retching frequently complicate recovery from anesthesia. Postoperative nausea and vomiting (PONV) is a patient-important outcome; patients often rate PONV as worse than postoperative pain. PONV usually resolves or is treated without sequelae, but may require unanticipated hospital admission and delay recovery room discharge [21].

Actually, the underlying mechanism of postoperative nausea and/ or vomiting (PONV) has not been fully elucidated. The 'central pattern generator' for vomiting involves key vomiting patterns Structures within the reticular lateral formation of the medulla oblongata, multiple sensory inputs received from the heart, abdominal viscera, vestibular system, brain stem area postrema (chemoreceptor trigger zone) and higher brain centers [22]. Through various mechanisms, noxious stimuli (such as surgery) can induce PONV, such as pain, neurotransmitter release (serotonin, dopamine), head positioning (through vestibular nerve stimulation) and opioid use [23].

Ahn *et al.* [24] who found that lidocaine administration was significantly lower the incidence of nausea compared with the control group in laparoscopic colectomy, it is most likely attributed to intravenous lidocaine decreased the total amount of fentanyl. This was confirmed by others studies revealed that lidocaine1.5mg/kg bolus intravenously 30 minutes before incision and constant rate infusion of lidocaine 2mg/kg/h until 1 hour after the end of procedure decreased the incidence of PONV [25]. However, the incidence of vomiting in this study was not significant difference between treatment group and control group. The results of the meta-analysis by **Weibel et al** [26] showed that IV lidocaine administration reduced nausea compared with control group during the perioperative period .

Gan *et al.* [27] who found approaches for decreasing baseline risk are presented. Strategies recommended to reduce baseline risk for PONV include (1) minimization of perioperative opioids with the use of multimodal analgesic regimens; (2) preferential use of RA; (3) preferential use of propofol infusions as the primary anesthetic; (4) avoidance of volatile anesthetics; and (5) adequate hydration in patients undergoing same-day surgery.

In addition, postoperative nausea and vomiting are affected by several factors such as the type, site and the duration of the surgery and also age, gender, weight and the presence of the history of dizziness in vehicles [28]. Also the pathophysiology of PONV is complicated, and several kind of receptors and their mediators have been implicated in PONV. (1) Serotonin type 3 (5HT 3 receptor), (2) dopamine type 2 receptor, (3) histamine type 1 receptor, (4) muscarinic cholinergic type 1 receptor, (5) steroid receptor and (6) neurokinin type 1 (NK1) receptor. Based on these findings, modern PONV prophylaxis adopts the principle of a multimodal approach to treat high-risk patients with at least 2 or 3 different kind of receptor antagonists, rather than increasing dosage of one single receptor antagonist [29].

Bolton and his associates [30] revealed that a large number of studies on patients showed the pharmacological prevention of PONV, especially with ondansetron and dexamethasone. Although the anti-PONV effects of these drugs have been established.

Nakajima his colleagues [31] who found suggested that the incidence of PONV and the need for antiemetic rescue medication in patients undergoing general anesthesia could be reduced by intravenous lidocaine. In addition in a study of **Echevarría and his associates** [32] also discussed the need for rescue antiemetic medication The incidence was lower in the intravenous lidocaine group.

CONCLUSION

The incidence of postoperative nausea and vomiting was lowered when patients drank freely clear fluids prior to the scheduled induction of day case anaesthesia.

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