

Review

Presentation, Treatment, and Complications of Acute Dehydration in Hyperemesis Gravidarum

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Abstract

Hyperemesis gravidarum (HG), a condition affecting a group of pregnant women, poses a complex clinical situation marked by persistent vomiting, dehydration, and weight loss. The prevalence rate of HG ranges from 0.5% to 2%, which means it carries risks for both the health of the mother and the developing fetus throughout pregnancy. The multifaceted etiology of HG involves hormonal factors, genetic predisposition, and other potential contributors. This review explores the key findings, clinical manifestations, and management strategies associated with HG. Identifiable risk factors, including prior HG history, multiple gestations, and extreme maternal age, contribute to its development. Hormonal factors, including increased levels of gonadotropin (hCG) and dysfunction in the thyroid, play a role in its development. Clinically, HG is marked by severe vomiting, dehydration, electrolyte imbalances, and notable weight loss. Timely and comprehensive management is paramount, necessitating a multidisciplinary approach involving intravenous fluids, antiemetic medications, nutritional support, and psychological counseling. In conclusion, HG underscores the unique healthcare needs of pregnant women, emphasizing the importance of addressing these needs promptly and comprehensively to safeguard both maternal and fetal well-being. This review sheds light on the intricate nature of HG, highlighting the significance of tailored interventions and continuous care throughout pregnancy to mitigate complications and ensure safe outcomes.

Keywords

Complications, Dehydration, Hyperemesis Gravidarum, Presentation, Treatment

Introduction

Hyperemesis gravidarum (HG) is a clinical condition of nausea and vomiting that impacts certain pregnant individuals leading to a weight loss of over 5% of their pregnant women's weight and may cause dehydration also (1). Due to this, uncontrollable vomiting, severe dehydration, and muscle wasting in pregnancy occur and usually require weeks or months of intravenous fluid therapy. Usually, dehydration happens when the body loses an extensive amount of fluids in comparison to what it consumes. This leads to symptoms, like blood pressure, heart rate, dry skin, confusion, and other manifestations (2). In Acute dehydration there is sudden and severe loss of body fluids that various factors, such as vomiting, diarrhea, excessive sweating, or inadequate fluid intake, can trigger this. The potential outcomes of these consequences can be quite severe, not only for the mother but also for her unborn baby. These include imbalances in electrolytes, failure of the kidneys harm to the brain, labor, restrictions in growth, and even loss of the baby's life. Many expectant mothers go through morning sickness in the 20 weeks of their pregnancy (3, 4). Typically, they may experience recurring symptoms like nausea and vomiting. However, this condition can sometimes cause dehydration, weight loss, electrolyte imbalance, reduced blood volume, and result in women seeking attention at emergency departments. This article describes the presenting symptoms, causes of hyperemesis gravidarum in dehydration, its associated clinical signs and complications, and the most common treatments offered. The exact cause of HG is not completely clear. Studies showed a possible connection between hormone levels during pregnancy, known as human chorionic gonadotropin (hCG). This hormone tends to peak around the 10th week of pregnancy (5). Other factors that could potentially play a role in HG include psychological aspects, digestive system issues, *Helicobacter pylori* infection, thyroid problems, and liver complications. HG causes persistent vomiting that leads to fluid loss and electrolyte imbalance (6-8). Dehydration happens mostly when the body can

absorb fluids instead of losing them. This may produce issues in the production and release of saliva, stomach acid, bile, pancreatic enzymes, and intestinal mucus. These changes can also worsen feelings of nausea and vomiting by affecting taste perception increasing stomach acidity hindering digestion and absorption and causing inflammation in the intestines. Individuals who are dealing with hyperemesis gravidarum (HG) may have encountered difficulties in managing their condition due to support from their healthcare professionals. According to a study conducted on a group of patients, those who believed that their providers failed to acknowledge or fully comprehend the seriousness of their condition were more prone to experiencing effects such as anxiety and depression. Such approaches by providers may decrease the likelihood that patients seek care in a timely manner. Although providers face a challenging situation due to the scarcity and low quality of studies evaluating the efficacy of antiemetics for HG. While there isn't evidence to confirm that serotonin, dopamine, or histamine directly cause this condition they are the focus of antiemetic medications. Available therapies have remained virtually unchanged over the past few decades, and affected patients only respond partially to the antiemetics that are currently recommended for HG treatment (9, 10). The current lack of clinical attention, misinterpretation of symptoms, and delayed diagnosis and treatment of HG patients underlines a need to improve clinical care. Therefore, promptly and effectively diagnosing and treating acute dehydration in HG is essential. So, this study aims to review currently available information of acute dehydration in hyperemesis gravidarum.

Methodology

For this study, we conducted a review of existing literature on September 9, 2023. We searched through databases, like Medline and Google Scholar, using medical subject headings (HG) and relevant keywords such as "hyperemesis gravidarum", "dehydration", "imbalance", "treatment", and "complications". To ensure the comprehensiveness of the search, additional publications were identified through PubMed, BMC

Journal, etc., using the citations of the selected articles as a guide. We conducted a search for information in articles that discussed the occurrence, management, and potential issues associated with acute dehydration in hyperemesis gravidarum. Only research relevant to the review not less than 2008 and providing essential information is taken for the study.

Discussion

Hyperemesis gravidarum impacts a portion of mothers with a prevalence rate of 0.5% to 2%. Although it's a relatively low occurrence, HG poses a high probability of risk to maternal and fetal health during pregnancy. Research has illuminated several crucial aspects of this condition. First, identifiable risk factors contribute to its development, including a history of HG in previous pregnancies, multiple gestations, and maternal age extremes. Moreover, studies suggest that there could be a tendency for women with a background of experiencing morning sickness during pregnancy to have an increased susceptibility. Hormonal elements also have an impact since HG is linked to levels of human chorionic gonadotropin hormone. These elevated levels could potentially contribute to the development and progression of HG (7). Additionally, alterations in thyroid function, such as hyperthyroidism, are often observed in HG patients.

Clinical Manifestation

Clinically, HG is characterized by severe and relentless vomiting that distinguishes it from typical pregnancy-related nausea and vomiting. Vomiting can occur multiple times a day and is often refractory to dietary changes and rest. This persistent vomiting leads to dehydration, a hallmark of the condition. Common symptoms of dehydration are mouth-chapped lips, hollowed eyes, and decreased urine production. Imbalances in electrolyte levels of potassium (known as hypokalemia) can often be detected and may lead to muscle weakness and irregular heart rhythms (11). Furthermore, excessive vomiting and reduced oral intake result in significant weight loss, raising concerns for both the mother and the developing fetus. The clinical features and diagnosis of acute

dehydration in HG depend on the severity of fluid loss and electrolyte imbalance (12). Mild dehydration can lead to feelings of thirst, low urine output, darker urine color, fatigue, headaches, dizziness, and constipation. When dehydration becomes moderate, it may cause hypotension (blood pressure upon standing), rapid heart rate (tachycardia), decreased urine production (oliguria), sunken eyes, dry skin with reduced elasticity (poor skin turgor), less tear production leading to dry eyes, irritability, confusion, and lethargy. Severe dehydration can result in shock, no urine production (anuria), sunken fontanelles in infants (soft spots on the head becoming depressed), cold and clammy skin with a bluish discoloration (cyanosis), rapid and shallow breathing (tachypnea), weak pulse (thready pulse) altered consciousness levels such as delirium or coma seizures or even death (2) (13). The diagnosis of dehydration in HG is based on signs and symptoms, along with laboratory tests. Laboratory tests can include measurements to assess aspects of our health. These may involve checking the concentration of urine, evaluating kidney function through the ratio of blood urea nitrogen (BUN) to creatinine, assessing salt balance by measuring serum sodium levels, monitoring potassium balance with serum potassium levels, examining acid-base balance through serum bicarbonate levels, evaluating water balance via serum osmolality checking blood cell concentration, with hematocrit measurements assessing oxygen carrying capacity with hemoglobin levels determining infection or inflammation through white blood cell count assessing liver damage or dysfunction through liver function tests (14-16). Evaluating thyroid hormone levels using thyroid function tests measuring fat breakdown, with urine ketones tests, and finally testing for urinary tract infection with a urine culture.

Management

Managing dehydration is essential in pregnant patients suffering from hyperemesis gravidarum, ensuring the safety of both the mother and her unborn child. For the management of this condition, urgent hospitalization may be necessary for resuscitation, where intravenous fluids are adjusted

based on the patient's current condition and also checking their electrolyte levels (17-19). Several drugs like ondansetron, promethazine, and metoclopramide have a crucial impact in controlling nausea and vomiting, helping patients maintain fluids and nutrition to prevent dehydration. Nutritional support is equally vital to address malnutrition resulting from reduced oral intake, potentially involving enteral or parenteral nutrition. Observing indicators such as vital signs, urine output, and electrolyte levels is crucial. This enables us to make the necessary modifications to fluid and medication plans as needed. Additionally, providing psychological support and counseling is crucial, as women experiencing HG may face significant emotional distress while coping with this condition's physical and emotional challenges. So, it is very significant to treat acute dehydration in hyperemesis gravidarum as a complex and potentially severe medical issue during pregnancy, which needs a multifaceted approach to management. Addressing key findings, understanding clinical manifestations, and implementing comprehensive care strategies are essential to mitigate complications and ensure a safe pregnancy outcome for both mother and baby. The management and prevention of acute dehydration in HG aim to restore fluid and electrolyte balance, control nausea and vomiting, and prevent complications. The treatment approach depends on the severity of dehydration and the response to previous therapies (20). In Mild dehydration, consuming rehydration solutions (ORS) consisting of water, glucose, and electrolytes will be effective in managing dehydration. ORS can be consumed in sips. Given through a tube inserted into the stomach via the nose if the patient cannot drink fluids. If dehydration is moderate to severe, intravenous (IV) fluids are required. Typically include saline (a salt solution with a concentration matching that of body fluids), glucose, and potassium. IV fluids can be administered both in the hospital and at home, but it must be ensured under the supervision of a healthcare expert since any adverse effect can happen anytime and must be treated in any instance. The amount and rate at which IV fluids are administered depends on the extent of dehydration and the patient's vital signs. The goal is to correct

the fluid deficit within 24 to 48 hours (21). Nausea and vomiting can be managed by using medications called drugs. These drugs work on receptors in the brain and guts to prevent or reduce vomiting. Several medications are utilized to address hyperemesis gravidarum symptoms, including antihistamines, like doxylamine, and dopamine antagonists, such as metoclopramide and serotonin 5 HT₃ receptor antagonists, like ondansetron. In addition, receptor antagonists like corticosteroids such as dexamethasone and cannabinoids, like Dronabinol, are also used for treatment (22). Antiemetic drugs can be administered orally rectally (through a vein) or trans-dermally (via skin patches) into the muscle) intravenously (through a vein) or trans-dermally (via skin patches). The choice of antiemetic drug depends on several things: safety, efficacy, availability, cost, and patient preference. Managing acute dehydration in hyperemesis gravidarum demands a comprehensive and multidisciplinary approach. Beyond antiemetic medications, a tailored choice of medication and vigilant monitoring of drug efficacy and side effects are essential aspects of treatment. In cases when conventional medications prove ineffective or when the symptoms of HG are particularly severe then medical professionals may consider employing corticosteroids, like methylprednisolone or dexamethasone, to alleviate nausea and vomiting. However, exercising caution and administering these drugs per the research findings supporting their usage is crucial. Nutritional support is paramount when oral intake is significantly compromised. In situations where enteral feeding is not possible or inadequate, parenteral nutrition becomes crucial as it involves administering nutrients. Close monitoring by a nutritionist or dietitian is imperative to maintain appropriate calorie and nutrient intake (23, 24). Psychological support plays a pivotal role in HG management. The distressing symptoms and prolonged illness often take a toll on a pregnant woman's mental health. Integrating counseling services and support groups into the management plan can provide emotional assistance and help patients cope with the psychological challenges associated with HG, improving treatment adherence and overall recovery. Continuous monitoring and

follow-up are crucial for successful HG management. Regular assessment of clinical status, vital signs, electrolyte levels, and urine output enables healthcare providers to address any evolving complications promptly. Patients are urged to communicate any alterations or apprehensions with their healthcare team, promoting a well-informed approach towards their care. Patient education is empowering and contributes to better treatment compliance. By offering materials and guidance on making changes, staying hydrated, and properly taking medication, we empower patients with the necessary information to effectively handle their condition. Prevention of acute dehydration in HG involves avoiding triggers that may worsen nausea and vomiting, such as strong odors, spicy foods, fatty foods, caffeine, alcohol, tobacco, stress, or motion sickness. To prevent nausea and vomiting, it is important to make changes in your diet and lifestyle. These can include having frequent meals, opting for non-spicy foods, consuming cold foods, drinking fluids between meals instead of during meals, trying ginger tea or ginger ale, taking vitamin B6 supplements, considering acupressure or acupuncture techniques exploring the benefits of aromatherapy or hypnosis and ensuring you get sufficient rest and sleep.

In acute dehydration, the maternal and fetal complications in HG mainly depend on the severity and duration of dehydration and the availability of adequate treatment. It can cause severe complications, and the outcome may become pretty serious. These may include significant weight loss, malnutrition, and deficiencies in essential vitamins like thiamine. There's another issue that can arise, which involves imbalances in electrolytes. Imbalances in the body's acid-base equilibrium can cause disturbances that result in conditions like metabolic alkalosis or ketoacidosis. HG can lead to kidney or liver problems, thyroid issues, and even physical complications such as esophageal rupture or brain damage. Besides all the difficulties, HG can also have an adverse impact on a mother's emotional well-being. It may cause distress and feelings of depression. Even leads to social isolation. Additionally, HG can contribute to an adverse effect

on a mother's quality of life. Resulting in increased healthcare expenses. The potential outcomes and complications during pregnancy due to HG are concerning for the baby. It can lead to growth in the womb, resulting in a condition known as growth restriction (IUGR). Babies who experience HG may be born with birth weights, causing them to be smaller than anticipated for their age. This is referred to as being small for age (SGA). There is also the risk of birth. Some newborns may have a low Apgar score or specific birth defects, like neural tube defects. Unfortunately, fetal distress or even fetal death can occur. The chance of occurrence of such conditions (e.g., attention deficit hyperactivity disorder, autism spectrum disorder) can have an impact on infants and potentially lead to the development of metabolic disorders, such as obesity and diabetes (25). Moreover, there exists an increased probability of encountering mental health concerns like anxiety or depression.

Conclusion

In pregnant women, hyperemesis gravidarum is experienced as well as is characterized by vomiting and can result in dehydration and weight loss. This involves many adverse health implications for both the mother and the developing baby, and it is influenced by factors such as hormones and genetics. A practical approach to managing HG involves various healthcare professionals who address fluid replacement, medication administration, dietary management, and psychological support. It is crucial to intervene in a timely manner throughout the pregnancy. It is necessary to provide attentive healthcare, ensuring the welfare of both the mother and the child.

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Conflict of interest

There is no conflict of interest

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Data availability

Data that support the findings of this study are embedded within the manuscript.

Author contribution

All authors contributed to conceptualizing, data drafting, collection and final writing of the manuscript.

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