5% dextrose with 0.9% saline versus 0.9% saline solution for the Initial Rehydration of Hyperemesis Gravidarum: A Randomized Controlled Trial

Thesis

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List of Abbreviations

5-HT3	: 5-hydroxytry-ptamine 3.
ALT	: Alanine aminotransferase.
apo-A	: Apolipoprotein A.
apo-B	: Apolipoprotein B.
ART	: Assisted reproduction techniques.
AST	: Aspartate aminotransferase.
BMI	: Body mass index.
CNS	: Central nervous system.
CRTZ	: chemoreceptor trigger zone.
CT scan	: Computed tomography scan.
DAO	: Diamine oxidase.
DNA	: Deoxyribonucleic acid.
EEG	: Electroencephalography.
EGG	: Electrogastrography.
FDA	: Food and Drug Administration.
FT3	: Free triiodothyronin.
FT4	: Free thyroxin (tetraiodothyronine).
GIT	: Gastrointestinal tract.
H.pylori	: Helicobacter pylori.
hCG	: Human chorionic gonadotropin.
HDL	: High- density lipoprotein.
HG	: Hyperemesis gravidarum.
hGH	: Human growth hormone.
i.v.	: Intravenous.
LDL	: Low - density lipoprotein.
LESP	: Lower esophageal sphincter pressure.
MRI	: Magnetic resonance imaging.
NaCl	: Sodium hydrocloride .
NTS	: Nucleus tractus solitarius.
NVP	: Nausea and vomiting of pregnancy.
PUQE	: Pregnancy-Unique Quantification of Emesis and Nausea.
RAS	: Reticular activating system.
TNF-α	: Tumor necrosis factor-alpha.
TPN	: Total parenteral nutrition.
TSH	: Thyroid stimulating hormone.

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VAT : Visceral adipose tissue.
VOR : The vestibuloocular reflex.

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INTRODUCTION

Nausea with or without vomiting is common in early pregnancy that mild symptoms may be considered part of the normal physiology of the first trimester. However, these symptoms can significantly impact the pregnant woman's quality of life, especially when persistent; Severe vomiting resulting in dehydration and weight loss is termed hyperemesis gravidarum ***(Jerrie et al., 2016).***

Hyperemesis gravidarum (HG) is a debilitating illness affecting 0.3–2.0% of pregnant women. It is characterized by continuous vomiting, dehydration, ketosis and muscle wasting. Usual anti-emetics are ineffective, and as yet there is no consensus on effective therapy. Many women are affected by nausea (80-85%) and vomiting (52%) in the first trimester of pregnancy. Severe vomiting requiring hospitalization occurs in 0.3-2.0% of all pregnant women, however hospital admission rates fall from 8 weeks. The peak severity for hyperemesis is around 12 weeks, and whilst most will resolve by 20 weeks, 10% will continue throughout pregnancy ***(Boelig et al., 2013).***

The term "hyperemesis" should be used only where one or more of the following exist: Persistent symptoms that have led to attendance at the hospital, the need for intravenous (IV) therapy, weight loss of > 4 kg (or >5%) and lack of response to usual antiemetic ***(Mullin et al., 2012).***

Other causes of severe nausea and vomiting need to be excluded. Some cases have other causes for symptoms and must be evaluated fully for serious obstetric and medical complications. For practical purposes, hyperemesis gravidarum has been defined as intractable vomiting of pregnancy severe enough (resulting in dehydration and weight loss) to require hospital admission which should differentiated from the less severe nausea and vomiting of pregnancy, which affects up to 85% of pregnancies ***(Gordon et al., 2013).***

Hyperemesis gravidarum is considered one of the most common indications for hospitalization in women with successful pregnancies. Patients affected by hyperemesis gravidarum are dehydrated and starved with associated metabolic, electrolyte, and endocrine disturbances. Hyponatremia is present in 43–49% and hypochloremia in 33–40% on hospital admission ***(Tan et al., 2009).***

Ketonemia and resultant ketonuria is the consequence of the switch to an alternative energy source when dietary glucose is insufficient for metabolic needs. ***(Comstock et al., 1990)***. The brain in the satiated state uses glucose as the exclusive energy substrate. The average requirement by the adult brain for glucose is 100 g per day and the recommended daily amount for glucose in pregnancy is 175 g. Adults should get 45–65% of their calories from

carbohydrates and young women in the first trimester of pregnancy should consume 2,400 calories per day ***(Institute of Medicine 2012).***

Its pathophysiology remains uncertain and there is no universally agreed therapy. At present, the management of HG includes hospitalisation, intravenous fluid and electrolytes replacement, thiamine supplementation, use of conventional anti-emetics and psychological support. Various types of fluid are used to correct dehydration in HG ***(Rachel, 2009).***

Correction of dehydration with intravenous fluid is one of the key aims of management. The volume of fluid should be adequate to replenish the deficit and continuing loss through vomiting as well as to meet normal fluid and electrolyte requirements .No trials have been performed to determine whether there is any clinical benefit of the use of a compound solution over sodium chloride. Fluid replacement can be tailored to ketonuria or electrolytes and stopped once these have normalized and a normal diet has resumed.

Suggested Hypothesis

In pregnant women with HG, rehydration with dextrose and saline may be as effective as saline only as regard clinical and laboratory improvement in patients.

Research Question

In pregnant women with HG, does rehydration with dextrose and saline is similar to saline only as regard clinical and laboratory improvement in patients?

THE AIM OF THE WORK

The aim of the study is to compare 5% dextrose and 0.9% saline versus 0.9% saline solution alone in the initial intravenous rehydration of hyperemesis gravidarum as regard clinical and laboratory improvement in patients.

VOMITING IN PREGNANCY

Nausea and Vomiting of Pregnancy (NVP)

Vomiting can serve the function of emptying a noxious chemical from the gut, and nausea ["nausea," refers to seasickness, derived from the Greek word "naus," meaning ship] appears to play a role in a conditioned response to avoid ingestion of offending substances. The sensory pathways for nausea and vomiting are generally well understood (e.g., vagal and vestibular inputs) but the pivotal problem of defining the convergent neuralcircuitry that generates nausea and vomiting is still largely unsolved ***(Anderka et al., 2012).***

Nausea and vomiting affect up to 85% of pregnant women. Although popularly known as 'morning sickness' one study demonstrated that less than 2% of women experienced nausea only in the morning and 80% reported nausea throughout the day. The condition is usually mild and self limiting ***(Sheehan, 2007)***. On average, symptoms begin 39 days after the last menses, peak in the 9^{th} to 11^{th} gestational weeks, and persist for 35–45 days ***(Hasler, 2008).*** Surprisingly, nausea and vomiting of pregnancy (NVP) apparently does not occur in other mammals ***(Danielsson et al., 2014).***

A debate has surrounded the issue of whether or not NVP symptoms serve useful functions. At the heart of this debate are two opposing hypotheses. The "prophylaxis, or