The relationship between amniotic fluid index (AFI) & single largest vertical pocket and perinatal outcome in late severe preeclampsia

Thesis

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LIST OF ABBREVIATIONS

Abbreviation	***Title***
AF	*Amniotic fluid*
AFI	*Amniotic fluid index*
AFP	*Amniotic fluid protein*
AFV	*Amniotic fluid volume*
BPP	*Biophysical profile*
Fig	*Figure*
IUGR	*Intrauterine growth restriction*
LSCS	*Lower segment caesarean section*
Min	*Minimum*
Max	*Maximum*
RDS	*Respiratory Distress syndrome*

SD	*Standard Deviation*
Tab	*Table*
VD	*Vaginal Delivery*
Wk	*Week*
Plasma ET-1	*Plasma endothelin-1*
VEGF	*Vascular endothelial growth factor*
PIGF	*Placental growth factor*
TGF	*Transforming growth factor*

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Abstract

Evaluation of AFV through ultrasound measurement is an essential part in tests of fetal well-being (BPP), by measuring the AFI or the MVP. The aim of this study is to compare the use of the amniotic fluid index with the maximum vertical pocket measurement as a screening tool for decreased amniotic fluid volume (An AFI <5 or single deepest pocket depth<2) in predicting adverse perinatal outcome in late severe preeclampsia (>34w). Participants included 60 women. Ultrasound was done for estimation of the amniotic fluid volume using AFI technique for the first group (30cases) and the MVP technique for the second group (60 cases) we concluded that AFI had more significant statistical relationship with perinatal outcome, hence AFI appeared to be a better predictor of perinatal outcome in preeclamptics in late severe preeclampsia.

Key Words: oligohydramnios – ultrasound – Perinatal outcome

Introduction

Despite years of extensive research, hypertensive disorders with pregnancy remain to be among the most significant unsolved problems in obstetrics. Hypertensive disorders complicate 5 – 10 % of all pregnancies, and together they are one member of the deadly triad – along with hemorrhage and infection – that greatly contributes to maternal morbidity and mortality ***(Martin et al, 2012).***

Preeclampsia syndrome is defined as hypertension and proteinuria with pregnancy after 20 weeks gestation ***(Martin et al., 2013).*** Severe preeclampsia is diagnosed by blood pressure > 160/110, evidence of proteinuria(>3gm/L), headache, visual disturbance, upper abdominal pain, oliguria, elevated serum creatinine, thrombocytopenia, elevated serum transaminase, fetal growth restriction and pulmonary edema ***(Martin et al., 2013).***

Assessment of fetal well-being in preeclampsia has been a subject of great interest. By far, ultrasound, Doppler evaluation and CTG are the main diagnostic tools in antepartum assessment. Oligohydramnios has long been recognized in preeclampsia especially in cases associated with fetal growth restriction ***(Cunningham et al., 2014).***

Chauhan and colleagues, 2007 found oligohydramnios in nearly 10% of pregnancies with suspected fetal growth restriction. Diagnosis of oligohydramnios based on amniotic fluid index (AFI) or single largest vertical pocket has been a subject of debate and controversy.

Aim of work

The aim of this study is to evaluate both AFI and single deepest pocket in patients with late severe preeclampsia, and to correlate both markers with different parameters of perinatal outcome.

Chapter 1: The amniotic fluid, its abnormalities and measurement

The amniotic fluid (AF) is clear, pale, slightly alkaline fluid with specific gravity of 1008-1080 that is produced in part by the amniotic cells, but is derived primarily from maternal blood during the first trimester of pregnancy ***(Cunningham et al., 2001).***

It is mainly composed of water (98-99%) and it contains albumin, sodium chloride, small amount of sugars, urea, uric acid, creatinine, ammonia, enzymes and hormones eg: estrogens; and suspended in it are lanugo hairs, vernix caseosa, epithelial cells and sometimes meconium. All compositions are in the same concentration as serum except calcium (5.5%) ***(Bacchi and Stefania., 2004).***

In the first half of pregnancy the amniotic fluid is the same as the extracellular fluid of the fetus and it is nearly devoid of any particulate matter. Ions and small molecules move rapidly into and out of the amniotic fluid without necessarily including changes in volume or concentration of amniotic fluid ***(Bacchi and Stefania., 2004).***

During the first trimester, the amniotic membrane floats freely between the embryonic cavities. Despite its simplicity direct transfer from the exocoelmic to the amniotic cavity via the amniotic membrane is limited and the AF contains very low protein concentrations ***(Jauniaux &Gublius., 2000).***

The total amniotic fluid protein (AFP) concentration is 900 times lower than maternal serum. Almost all individual proteins, except AFP, are present at very low concentrations in the AF. The vitteline duct has the same cellular constitution as the secondary yolk sac. AFP could be

moved in the AF via the vitteline duct and from 10 weeks post menstruation when the anal membranes breakdown, intestinal AFP is also found in AF ***(Jauniaux &Gublius., 2000).***

In the second half of pregnancy, the AF is largely a product of fetal urine and lung fluid. Fluid is reabsorbed via fetal swallowing. An additional route of AF absorption is required to balance fluid output and absorption; this absorption is theorized to occur across the fetal amnion into the fetal vasculature, and has been named the intra-membranous pathway. In addition, AF volume depends on fetal hydration. All water in the conception ultimate derives from the mother; therefore placental water flux is also a factor determining amniotic fluid volume (AFV) ***(Beall et al., 2007).***

The contribution of fetal urine into the AF makes it quiet hypotonic when compared with maternal or fetal plasma because of the lower electrolyte concentration in the urine but it contains more urea, creatinine, and uric acid than do plasma. So the effect is decreasing the osmolarity of AF with increasing length of gestation, and these observations have been shown to exist in utero as early as the twenty fourth week of pregnancy ***(Michaels et al., 2007).***

With progression of pregnancy, glycerol-phospholipids, primarily from the lung, accumulate in the fluid and variable amounts of particulate matter in the form of desquamated fetal cells, lanugos scalp hair and vernix caseosa are shaded into the AF and the concentration of various solutes also change significantly ***(Patterson et al., 1987).***

Functions of Amniotic fluid

Amniotic fluid serves several roles during pregnancy. It creates a physical space for fetal movement, which is necessary for normal