

Evaluation Of Amniotic Fluid Volume In Diabetic Pregnant Women Using Ultrasonography

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Abstract: The objective of this study is to assess and evaluate amniotic fluid volume in diabetic pregnant women in second and third trimester using ultrasonography. Also to determine the value of amniotic fluid volume in diabetic pregnant women and its incidence of polyhydramnios and oligohydramnios and determine the reasons of them in Sudan and its relationship with diabetes mellitus. The study depends on the international protocols in obstetrical scanning through which the data was collected on configuration of easy questionnaire?. The data was collected within the period from 18 March 2012 to 13 November 2012. This study included 100 pregnant diabetic women from different diagnostic hospitals and centers in Khartoum state. The study depends on the large single vertical deepest pocket. Most Sudanese population has abnormal incidence of polyhydramnios with the normal maximum vertical pocket ranging between 2 to 8 cm. Abnormally increase in amniotic fluid volume (AFV) polyhydramnios represent (56%) of sample size. Normal amniotic fluid volume (AFV) represent (41%) of sample size. Abnormal decrease in amniotic fluid volume (AFV) oligohydramnios represent (3%) of sample size. It is recommended to train health care providers in obstetric to measure amniotic fluid volume for early diagnosis to any abnormality (polyhydramnios or oligohydramnios) that may affect either the fetus or the pregnant diabetic women and to treat it early. It is recommended to facilitate availability of ultrasound machine in every hospital and medical health centers. It is recommended that other factors, which can affect the accuracy of amniotic fluid volume and contribute to differences should be evaluated in further studies.

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1. Introduction

Measuring amniotic fluid volume is essential in pregnancy assessment. (Schrimmer et al, 2002). Changes in amniotic fluid volume are associated with adverse pregnancy outcome. The estimation of amniotic fluid volume in the late pregnancy is important for the assessment of fetus health, death, operative delivery (Schrimmer et al, 2002).

The amniotic fluid index (AFI) and single deepest pocket are used to detect oligohydramnios in order to predict risk for caesarean delivery (Murray et al 2000). Findings of diminished amniotic fluid index is generally perceived as a sign of placental insufficiency (Desai et al. 2004), Intra Uterine Growth Retardation as well as renal anomalies in the second trimester. The most common reasons of Polyhydramnios are increased urine production and maternal diabetes mellitus, fetal macrosomia or other conditions that predispose to a fetal hyperdynamic

circulation. (Trish et al, 2004.) Several studies on AFI has demonstrated serial changes of mean AFI values weekly with the threshold for oligohydramnios and polyhydramnios during pregnancy. (Moore, 1990, Nwosu, et al 1993, Hallak, et al 1993).

Normally the amniotic fluid volume increases from approximately 250 mL at 16 weeks to 1000 mL at 34 weeks, declining thereafter to approximately 800 mL at term. The amniotic fluid volume reflects the status of both the mother and the fetus and is altered in many physiological and pathological conditions. Both pre-gestational (Kitzmilller. Et al 1993.) and gestational diabetes mellitus (Coustan. 1993., Casey, et al 1997) can lead to fetal death, or fetal abnormalities (Cordero, 1993., Hod, et al 1991., Khwaja et al 1986.).

A Variety of approach including biophysical methods, deepest pocket, AFI, 3D, subjective estimation is important and the clinician should

consider also AFV as an assessment technique for a given clinical situation taking into account the biology of amniotic fluid formation and regulation through gestation.

This study aimed to determine the amount of amniotic fluid volume in diabetic patient in second and third trimester using ultrasonography.

2. Material and Methods

The study was done in Khartoum state hospitals - Sudan including: - Omdurman military hospital. - Bahari teaching hospital. - alsaudy hospital. -Alzaem Alazhari clinic. -Omdurman maternity hospital. - Some other diagnostic health and private centers. In the period of 8 months, from 18 of March 2012 to 13 of November 2012.100 diabetic pregnant Sudanese women in their second and third trimesters come to obstetric and gynecological department for evaluation with Ultrasound were randomly selected with accurate menstrual dates. The data was collected using ultrasound machine. _ Questionnaire (data collection sheets). Different types of ultrasound machines were used: Aloka-SDU-2200-Probe T.A convex 3.5 MHZ, - HDI 5000 Sono CT.Probe T.A convex 3.5 MHZ. Toshiba T.A convex 3.5 MHZ. Siemens T.A convex 3.5 MHZ. Shemadzu - SSD-500. Probe-A Convex 3.5 MHZ.

Data analysis was performed with statistical package for social science (SPSS) version 12.0 software. t. test was used to assess whether the systemic errors were significant.

3. Results

Total of 100 pregnant diabetic women were included with the range of maternal age from 20-50 years with a mean of 35 years. Most Sudanese population has abnormal incidence of polyhydramnios with the normal maximum vertical pocket is between (2-8 cm). Abnormal increase in amniotic fluid volume (AFV) polyhydramnios represent (56%) of sample size. Normal amniotic fluid volume (AFV) represent (41%) of sample size.

Abnormal decrease in amniotic fluid volume (AFV) oligohydramnios represent (3%) of sample size. The majority of diabetic pregnant women are among the age group (31 _ 40) and (20_30) years which represent (46%) and (40%) of the sample size. The majority of diabetic pregnant women are among the housewife group which represent (79%) of the sample size.

The majority of diabetic pregnant women are among the group of multigravida with (60%) of the sample size. The majority of diabetic pregnant women are found to have polyhydramnios (abnormal increase in amniotic fluid volume) which represent (56%) of the sample size. (figure 1). The majority of

diabetic pregnant women are among the group of type1 D.M with (38%) of the sample size. (Table 1) The majority of diabetic pregnant women are complaining of clinical findings related to abdominal enlargement with (96%) of the sample size. (figure 2). The majority of diabetic pregnant women are among the third trimester period which represent (73%) of the sample size. (figure 3) The majority of diabetic pregnant women are under treatment of D.M by using insulin represent (54%) of the sample size. The majority of diabetic pregnant women are well controlled from D.M represent (56%) of the sample size with (44%) of sample with uncontrolled treatment. Therefore, as conclusion the majority of diabetic pregnant women is among type1 D.M with (38%), and has polyhydramnios with (56%) of sample size. (Table 2)

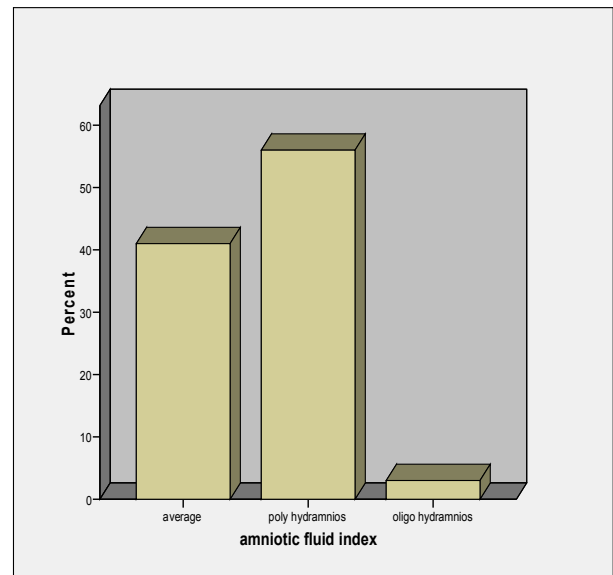


Figure 1 distribution of sample by amniotic fluid index

Table 1: shows distribution of sample by type of diabetes:

type of diabetes	Frequency	Percent
type1	38	38.0%
type2	26	26.0%
Gestational type	36	36.0%
Total	100	100.0%

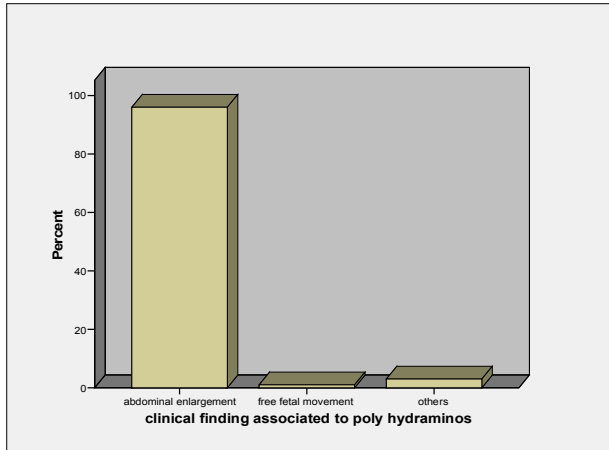


Figure 2 distribution of sample by clinical finding associated to polyhydramnios:



Figure 3 distribution of sample by gestational age
Table 2: type of diabetes × amniotic fluid index:

????????		amniotic fluid index			Total
		average	poly hydramnios	oligo hydramnios	
type of diabetes	type1	17	20	1	38
	type2	16	9	1	26
	gestational type	8	27	1	36
Total		41	56	3	100

P-value =0.033 (P-value < 0.05)

4. Discussions

During the period from March 2012 to November 2012 100 pregnant diabetic women in second and third trimester were examined antenatal and scanned to measure the amniotic fluid volume. Diabetic pregnant women from different areas of Sudan in different diagnostic hospitals and centers in Khartoum state in second and third trimester were examined antenatal and scanned to measure the amniotic fluid volume. Accurate estimation of liquor is of great importance for proper planning and management for labor and postpartum period to optimize safe delivery leading to safe motherhood,

perhaps this is the 3rd study dealing with estimated volume by Ultrasonography in Sudan. two studies were conducted during (April 2012) by Rian Omer Massaad Elbasheer, Sudan University of science and technology, MS.c degree in medical Diagnostic Ultrasound. The true evaluation of liquor volume by ultrasonography in Sudan is almost lacking due to many factors as in most parts of the developing world due to the facts that more than eighty percentages of women conduct home delivery so the liquor not evaluated. In evaluation the liquor volume by ultrasonography, we must put in mind that many problems associated with the measurement. The most important is, probably, the proper assignment of menstrual age, since inaccurate dating will result in inappropriate entry of data at the wrong menstrual week. These type of errors will have some impact on the mean value and result in increasing or decreasing the liquor. This frequently have an underestimation or overestimation of the volume. This in turn can have effect on the mean value. This factor has no effect on our study. The scanning procedure includes diabetic pregnant women from different areas of Sudan in different diagnostic hospitals and centers in Khartoum state. In order to observe any possible effect of diabetes mellitus in amniotic fluid volume on estimating error and for comparison purpose. They were strong correlation with the result of Rian Omer Massaad Elbasheer research, Sudan University of science and technology, MS.c degree in medical Diagnostic Ultrasound, Khartoum, SUDAN. it was observed that the AFI in millimeters in all patient with diabetes mellitus 26 out of 50 patients have increasing AFV. it is concluded that the measurement of AFV by two measurement and compared with type of diabetic and diabetic status is important to show the effect of diabetic in pregnant women's. Also a research of Department of Obstetrics and Gynecology, Kofinas Perinatal and Fertility Institute, New York Methodist Hospital, Brooklyn, New York. reported that AFI in normal pregnancies was less than that in diabetic pregnancies throughout the gestational ages studied (27–42 weeks). In normal pregnancy, the mean AFI was 14.0 cm at 27 weeks and decreased to 11.4 cm at 42 weeks ($r=0.25$, $p=0.0005$), whereas in diabetic pregnancies, the values remained stable throughout the gestational ages studied.

Most Sudanese diabetic pregnant women have amniotic fluid volume that is abnormally increase (polyhydramnios). Further studies should be established using both AFI and largest pocket to evaluate AFV, employing large samples to confirm these findings.

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References

1. DB Schrimmer, TR Moore. Sonographic Evolution of Amniotic Fluid Volume. *Clin Obstet Gynaecol* 2002;45:1026–38
2. E Murray et al. Assessment of foetal growth size and well being. A guide to effective care in pregnancy and child birth. 3rd ed. Oxford university press 2000; 80 – 92.
3. [3] Desai pan kay et al. Decrease of amniotic fluid index in low risk pregnancy. Any significance? *J obstet Gynecol Ind*; 2004; 54(5) 464 – 466.
4. Trish Chudleigh, basky thilaganthan. obstetric ultrasound (how why and when), third edition, endburgh London New York, 2004; page 14
5. TR Moore, JE Cayle. The AFI in normal human pregnancy. *Am J Obstet Gynaecol*; 1990; 162:1168–73.
6. EC Nwosu, CR Welch PR Manasse. Longitudinal assessment of amniotic fluid index. *Br J Obstet Gynaecol*; 1993; 100:816–9.
7. M Hallak, B Kirshan, EO Smith, DV Cotton. Amniotic fluid index; gestational age specific values for normal human pregnancy. *J Reprod Med*; 1993; 38:853–5.
8. JL Kitzmiller. Sweet success with diabetes. The development of insulin therapy and glycaemic control for pregnancy. *Diabetes Care* 16[Suppl 3] 1993:107-121
9. DR Coustan. Gestational diabetes. *Diabetes Care* 16[Suppl 3]: 1993;8-15.
10. BM Casey, MJ Lucas, DD McIntire, Leveno KJ. Pregnancy outcomes in women with gestational diabetes compared with the general obstetric population. *Obstet Gynecol* 1997;90: 869-873.
11. L Cordero, MB Landon. Infant of the diabetic mother. *Clin Perinatol* 1993;20: 635-647
12. M Hod, Merlob, S Friedman, A Schoenfeld, J Ovadia. Gestational P diabetes mellitus. A survey of perinata complications in the 1980 s. *Diabetes* 40[Suppl 2] 1991;74-78
13. SS Khwaja, SA Uduman, H Al-Sibai, SA Al-Suleiman. The oversized infant. A study of 86 cases. *Aust NZ J Obstet Gynaecol* 1986;26: 22-25.

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