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Original Research Article

Outcome of pregnancy and neonate after Laparoscopic Sleeve Gastrectomy: Retrospective study, two centers assessment, 145 cases

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Abstract

Obesity is a major global growing public-health problem. About 25% of women are suffering from obesity, of which one-third are at child bearing age (from 18 to 45 years old). Laparoscopic Sleeve Gastrectomy (LSG) is one of the main bariatric surgeries known to be safe and effective in weight reduction. However, little is known about pregnancy and neonate outcomes post LSG. A retrospective study was done in Riyadh, KSA. Data were collected from two centers in King Khalid University Hospital (KKUH) and Specialized Medical Center (SMC). From a total of 145 pregnancies in 106 females, there were 21 spontaneous abortions (14.5%), 13 preterm deliveries (10%), 45 Caesarean sections (36.3%) and six females having complications during their pregnancy (4.2%). Two cases ended up with the death of the neonate (1.6 %). Also, two cases had abnormalities (1.6 %). Thirty-eight neonatal births with a weight less than 2.5 kg (30.6%) were observed and the mean birth weight was calculated to be 2.6 kg (S.D ± 0.6 kg). After comparing our results with literature, we can conclude that females post LSG have complications on pregnancy and neonate much less than obese females because of weight reduction. On the other hand, LSG is associated with a high rate of low birth in Saudi population, but the cause is still not clear. A good follow-up post-LSG and nutritional advice could improve the outcome.

Keywords: Pregnancy; Neonate; LSG.

INTRODUCTION

Obesity is a major global growing public-health problem (World Health Organization, 2008). About 25% of women worldwide are suffering from obesity; one-third of them are at childbearing age (from 18 to 45 years old) (Kaska et al., 2013). During pregnancy, obese females are at increased risk of several complications such as spontaneous abortion, cesarean section, preterm delivery and stillbirth (Wang et al., 2002; Bhattacharya et al., 2007). Therefore, weight reduction is strongly recommended prior to pregnancy (American College of Obstetricians and Gynecologists, 2005).

Laparoscopic Sleeve Gastrectomy (LSG) is one of the main Bariatric surgeries that is known to be safe and efficient for weight reduction nowadays (Molony et al., 2016). Reported complications percentages post-LSG, gastric leak, suture line hemorrhage and abscess, were

2-3%, 3.4%, and 0.7% respectively (Varban et al., 2016; Nocca et al., 2017; Mansour MA, 2017). Almost 80% of females who had LSG were at childbearing age (Han et al., 2013). There are only two reports published on the outcomes of pregnancy and neonate post-LSG (Han et al., 2013; Ducarme et al., 2015). LSG was considered a safe option for morbidly obese female at childbearing age (Han et al., 2013). However, a female who remains obese post LSG is at higher risk of complications, including low birth weight and preterm delivery. Hence, these groups should be regarded as high-risk group (Ducarme et al., 2015). Moreover, none of these studies calculated the incidence of spontaneous abortion. On the other hand, pregnancy post Roux-en-Y gastric bypass and post laparoscopic adjustable gastric banding was significantly associated with low birth weight (Maggard et al., 2008; Lapolla et al., 2010). Furthermore, little is known about pregnancy and neonate outcomes post LSG.

The objective of this study is to report and analyze the outcomes of pregnancy and neonate post-LSG. The study hypothesis states that weight reduction post LSG will help in minimizing the risk of complications accompanying obese pregnant females.

METHODS

A retrospective study was done in Riyadh, Saudi Arabia. Data were collected from two centers: King Khalid University Hospital (KKUH) and Specialized Medical Center Hospital (SMC). The study inclusion criteria were all females at childbearing age (from 18 to 45 years old) who underwent LSG and had been known to be pregnant afterward. Patients' data were obtained from surgery departments' database in both centers from January 2009 to August 2015.

The information were retrieved from medical records followed by a phone interview or a written questionnaire filled by one of the team members. The study was reviewed and approved by King Khaled University Hospital Institutional Review Board (KKUH IRB). Informed consent was taken from each patient by explaining the research interest and justifying the purpose and objectives of the study. The measurable outcomes were spontaneous abortion, preterm labor, cesarean section, low birth weight, mortality and morbidity of the neonate. The independent variables were age, BMI at conception and duration between the surgery and conception.

As per the study protocol, age, BMI at conception, and duration between LSG and conception were recorded for each pregnancy. In order to test the significant difference between the variables and the outcomes, SPSS software, version 23 (SPSS Inc., Chicago, Illinois, USA) was used. Bivariate Pearson Correlation test, the chi-square test, and binary logistic regression model were carried out at a significance level of 0.05.

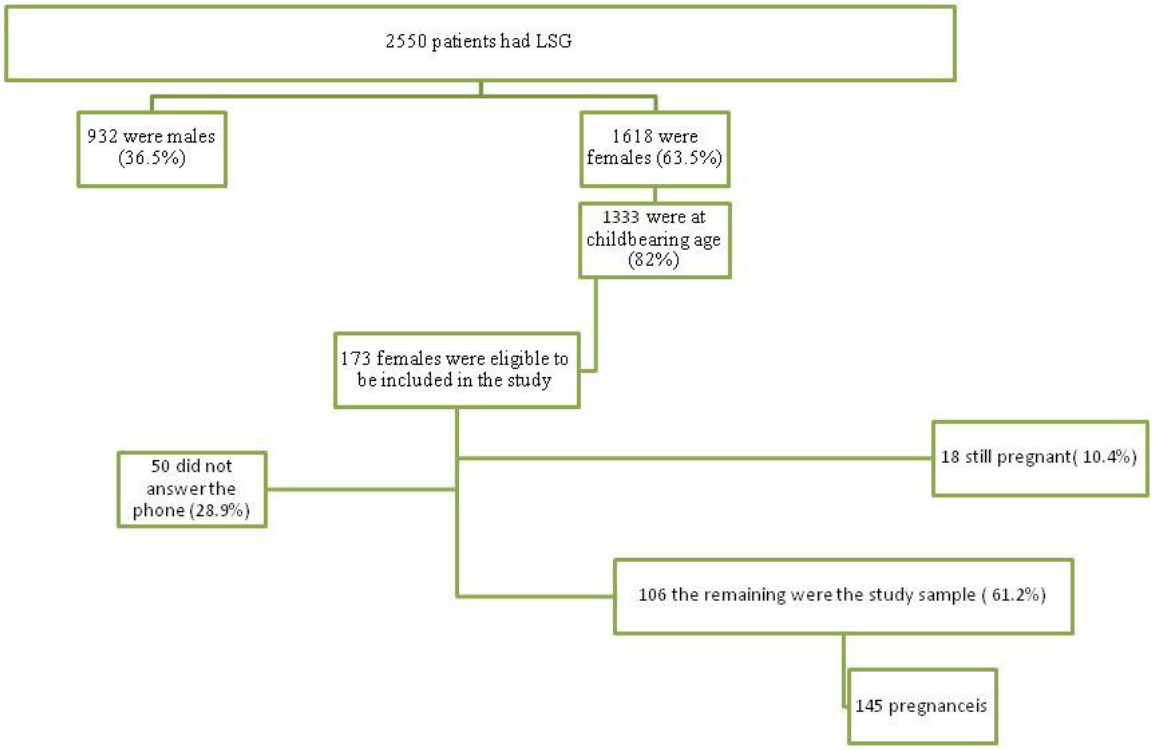
RESULTS

Between January 2009 and August 2015, 2550 patients had LSG in both centers, from which 932 were males (36.5%), and 1618 were females (63.5%). The study identified 1333 females out of 1618 were at childbearing age (82%). 173 females were eligible to be included in the study. There were 18 females still pregnant and they were excluded and another 50 females who did not answer the phone. Thus, the remaining 106 females were the study sample size (Graph 1).

Out of 106 females, there were 145 pregnancies; three of them were twins (2%). The average age at conception was 31.4 years (S.D ± 4.7 years). Pre-LSG BMI and BMI at conception were 44.8 kg /m^2 (S.D ± 7.1 kg /m^2) and 28.6 kg /m^2 (S.D ± 5.5 kg /m^2) respectively. Mean months between the LSG and conception were 21.1 months (S.D ± 13.5 months). Furthermore, 25 females got pregnant for their first time post-LSG (23.5%). Seventy-six females had one pregnancy post-LSG (71.7%), 23 females had two pregnancies (21.7%), six females had three pregnancies (5.7%), and only one female had four pregnancies post LSG (0.9%). Spontaneous abortion was recorded in 21 out of 145 pregnancies (14.5%). They were all excluded from the following analysis. Out of the remaining 124 pregnancies, 13 cases had preterm deliveries which define as delivery before the 37th week of gestation (10%) (Vrebosch et al., 2012). Moreover, 79 pregnancies had a vaginal delivery (63.7 %). 45 pregnancies had Caesarean (36.3%); 26 of them had an elective c-section (57.7%), 12 had an emergency (26.6) and 7 were due to patient's desire (15.5%). Although six females had complications during pregnancy (4.2%), only one of them had a placental abruption and ended with the death of the neonate due to a cardiac anomaly.

Accordingly, reported complications were placental bleeding, oligohydramnios, urinary tract infection (UTI), appendicitis and recurrent abortions. Furthermore, only a few females had malnutrition, but this did not affect the study outcomes, and they responded well to routine treatment. Only two cases ended up with the death of the neonate (1.6 %). Also, two cases had abnormalities (1.6 %). One had Spina bifida, and the other one had Noonan syndrome. Regarding the weight of neonates, 38 of them were less than 2.5 kg (30.6%), and the mean birth weight was calculated to be 2.6 kg (S.D ± 0.6 kg).

After testing the three variables with the five outcomes, there were two significant factors; for each BMI unit increase, the odds of preterm delivery significantly increased by a factor of 1.31 ($P < 0.05$); moreover, the odds of C-section delivery significantly



Graph 1.

Table 1. Pregnancies distribution according to BMI categories and incidence of Preterm

BMI at conception	Number of pregnancies	Incidence of Preterm
18.5 - 24.9 = Normal weight	31(21.4 %)	2(6.4%)
25 - 29.9 = Overweight	64(44.1 %)	4(6.2%)
30 - 34.9 = Class I obesity	36(24.8 %)	5(13.8%)
35 - 39.9 = Class II obesity	9(6.2 %)	0(0%)
40 - 49.9 = Class III obesity	4(2.8 %)	1(25%)
50 - 59.9 = Class IV obesity	1(0.7%)	1(100%)

Table 2 .Pregnancies distribution according to age categories and incidence of C-section

Age (years)	Number of Pregnancies	Incidence of C-section
18 – 25	14 (9.7%)	4 (28.5%)
26 – 35	105 (72.4%)	27 (25.7%)
36- 45	26 (17.9%)	14 (53.8%)

increased for each one year increase in age by a factor of 1.27 (P<0.05). All the remaining factors were not significant. (Table 1,2)

DISCUSSION

LSG is a well-known bariatric procedure proven by this study to reduce weight. In this study, 82% of females who underwent LSG were of childbearing age (from 18 to 45 years old) which is in accordance with the literature (Han et al., 2013). The study objective is to report and analyze the measurable outcomes. The rate of measurable outcomes was compared with Saudi population pregnancy, obese pregnancy and different type of bariatric surgeries.

According to Ministry of Health (MOH) in KSA, the abortion rate among Saudi population is (16.1%) (Kingdom of Saudi Arabia Ministry of Health, 2016). On the other hand, obese females have increased rate of abortion (20%) (Katz et al., 2012). Reported spontaneous abortion post-Roux-en-Y gastric bypass and post laparoscopic adjustable gastric banding was (9.3%) and (8.7- 29%) respectively (Abodeely et al., 2008; Vrebosch

et al., 2012). While post-LSG spontaneous abortion incidence rates have not published yet. In this study, spontaneous abortion post-LSG was (14.5%). Moreover, there was no association between the rate of abortion and the study measured variables. Thus, through weight reduction, post-bariatric surgery pregnancy has a low rate of spontaneous abortion as expected.

Preterm labor is defined as a delivery before the 37th week of gestation (Vrebosch et al., 2012). In this study, the rate of preterm delivery was 10%, which is considered high comparing to Saudi population preterm rate (3.9%) (Kingdom of Saudi Arabia Ministry of Health, 2016), but it is low compared to obese female preterm labor (20.4%) (Bhattacharya et al., 2007). Furthermore, this rate is in accordance with the reported rate post-laparoscopic adjustable gastric banding (9.9%) and post-LSG (13%) (Eyal et al., 2009; Ducarme et al., 2015). On the other hand, Roux-en-Y gastric bypass has a less rate of preterm delivery (3.6%) (Eyal et al., 2009). Obese females posts LSG are at a higher risk of low birth weight and preterm delivery according to a recent study (Ducarme et al., 2015). However, In this study, 45 pregnancies were through obese females, from which 7 had a preterm delivery (15.5%). Yet, this rate is considered in the normal range. Regarding low birth weight, it is defined by World Health Organization (WHO) to be less than 2.5 kg (United Nations Children's Fund and World Health Organization, 2004). In this study, the overall rate was 30.6%. For further analysis, the cases of low birth weight were divided according to maternal BMI at conception. The first group of obese females had 13 neonates with low birth weight (28.5%). On the other hand, the second group of normal weight or overweight had 25 neonates with low birth weight (26.3%). Thus, both groups had a high rate of low birth weight compared to a database of MOH in KSA (16.1%) (Kingdom of Saudi Arabia Ministry of Health, 2016). Also, this rate is high compared to reported post-Roux-en-Y gastric bypass (7.3%), laparoscopic adjustable gastric banding (9.4%) and LSG (10%) (Eyal et al., 2009; Ducarme et al., 2015). After comparing the study cesarean section rates (36.3%) with the rate in general Saudi population pregnancy (20.9%), the rate in this study is increased (Kingdom of Saudi Arabia Ministry of Health, 2016). However, the cesarean section rate of this study was still low in obese pregnancy, which was (42.7%) (Bhattacharya et al., 2007). Furthermore, caesarean section rates post laparoscopic adjustable gastric banding (30.7%), post-Roux-en-Y gastric bypass (25.5%) and LSG (15.5%) were 20% (Eyal et al., 2009; Maggard et al., 2008; Ducarme et al., 2015). Further to note that many studies are suggesting that bariatric surgery is not a risk factor for Cesarean section (Bar-Zohar et al., 2006; Dell' Agnolo et al., 2011; Guelinckx et al., 2009; Maggard et al., 2008; Sheiner et al., 2009). On the other hand, a report shows that bariatric surgery is an independent risk factor for cesarean section, and the cause is still not clear (Vrebosch et al., 2012; Sheiner et al., 2004).

MOH in KSA yearbook showed that the stillbirth rate was 1.2% in Saudi population pregnancy while in this study it is slightly higher (1.6%) (Kingdom of Saudi Arabia Ministry of Health, 2016). Accordingly, the rate of stillbirths increased in obese pregnant (2.5%) (Bhattacharya et al., 2007). Furthermore, the rate of stillbirths post laparoscopic adjustable gastric banding is 1.2%, post-Roux-en-Y gastric bypass is 0.6% and LSG is 0% (Abodeely et al., 2008; Han et al., 2013). In this study, two pregnancies ended up with morbidity (1.6%). Moreover, reported morbidity post laparoscopic adjustable gastric banding is 0% and post-Roux-en-Y gastric bypass is 0 % - 5%, while LSG has not been reported (Vrebosch et al., 2012; Irene et al., 2016; Han et al., 2013; Ducarme et al., 2015).

Finally, heath centers should necessitate good and regular follow-up post LSG to prevent or minimize post LSG complications on pregnancy and neonate outcomes.

CONCLUSION

After comparing our results with literature, we can conclude that females posts LSG have complications on pregnancy and neonate much less than obese females because of weight reduction. On the other hand, LSG is associated with a high rate of low birth weight in compared to Saudi population weight but the cause is still not clear. A good follow-up post-LSG and nutritional advice could improve the outcome.

The study recommends that obese females who are willing to get pregnant and get healthy neonate can safely can have LSG, but with a regular post-LSG follow-up regarding their health status. Also, we recommend for future studies to include a larger sample size with long follow-up using prospective data in a controlled manner.

Limitations

There were difficulties in communicating with some patients and confirming their information. After trying to call them all at different times, we only reach 106 candidates.

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Conflicts of Interest

All authors declare that there is no conflict of interest

Finacial Disclosure

None of the authors have received any financial benefit.

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