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Research Article

Effect of Breastfeeding Period on Obesity and Hepatosteatosis

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Abstract

Hepatosteatosis, which we frequently observe today with change in lifestyle, is often unnoticed, but preventable and reversible; if not prevented, it can lead to serious comorbidities. One of the factors causing this condition is insulin resistance during the gestation period and diabetes mellitus, particularly because of excess weight that cannot be lost after pregnancy. There are multiple factors, but we investigate the effect of breastfeeding in the process. This study aims to investigate the effect of breastfeeding on non-alcoholic hepatosteatosis in female patients aged 20-40 years old who have given birth. There is contradicting evidence in the literature; we believe that breastfeeding has a protective effect on hepatosteatosis.

Keywords: Breastfeeding; Body Mass Index; Hepatosteatosis; Fibrosis Score

Introduction

Increasing worldwide obesity and associated diabetes and hepatosteatosis is a major health problem and occupies an important space in the daily practice of hepatology. The effective treatment of viral hepatitis with antiviral treatments and the acceleration of vaccination studies with the progression of preventive medicine possibly causes a shift from viral hepatitis, which is prominent in the etiology of cirrhosis, to non-alcoholic steatohepatitis (NASH). In addition to the increase in visceral adipose tissue, the content of free fatty acid in the portal area increases in the liver. Consequently, the ratio of fatty acid released from the liver decreases [1]. Hepatosteatosis results in different clinical images based on the percentage of affected hepatocytes [2]. Non-alcoholic fatty liver disease (NAFLD) occurs because > 5% of hepatocytes were affected [2,3]. Its prevalence varies between different societies. In the later period, inflammation and lipotoxicity forms the underlying basis of transformation of simple steatosis in the liver into steatohepatitis [2,4]. This clinical image is called non-alcoholic steatohepatitis (NASH). In advanced stages, 20% of patients can develop progressive fibrosis and cirrhosis and hepatocellular cancer (HCC) can be seen [2,4-7]. Comorbid conditions, particularly the presence of diabetes mellitus (DM), accelerates this process [8]. The prevalence of NAFLD and NASH is between 3% and 50% in different studies [6]. NAFLD, which is associated with metabolic syndrome, can therefore develop on the basis of insulin resistance, particularly on the background of type 2 DM [6,8]. The most frequently monitored age group is 50-60 years. Although not reported in every study, being a woman is a risk factor, and this condition is more common in the Hispanic population_[6]. In certain studies, note that the male gender is a risk factor [4,9]. It is associated with obesity and hypertriglyceridemia caused by a sedentary life [10]. Previous studies have emphasized that conditions such as polycystic ovary syndrome, dyslipidemia and obstructive sleep apnea syndrome are associated with NAFLD [4]. According to World Health Organization (WHO) data in 2016, > 650 million obese individuals were detected worldwide [11]. 2017 data published in Turkey indicate that the prevalence of being overweight was 66.9%. With respect to sex, this prevalence is 70% in women and 63.7% in men [12]. The prevalence of NAFLD in Turkey is estimated to be ~30% [13]. Hepatitis C and HIV can be included as risk factors that causes the disturbance of metabolic balance. They increase the risk of primary aldesteronism and myotonic dystrophy [5]. An inverse correlation has been reported between the severity of NAFLD and the vitamin D level [9]. There are patients monitored for NAFLD who are not obese (BMI < 23 kg/m^2) [9]. Here the effect of waist circumference and triglyceride levels comes to the fore. Although sarcopenia is associated with hepatosteatosis, it is an independent risk factor for NAFLD [7,14]. Insulin resistance forms the basis of NAFLD but genetic effects are also monitored [2]. The gene whose effect is considered to be the highest is PNPLA3 [15]. Melanocortin-3, hepatic triacyl glycerol (HTAG), and TM6SF2 mutations are present [4,10]. Insulin resistance most often occurs as part of metabolic syndrome and is diagnosed in the period of diabetes and prediabetes [2]. Excess calories disrupt the signaling pathway, which begins with the insulin receptor [8]. A study showed that IGF-1 (insulin-like growth factor- 1) levels in the NAFLD group were low and IGF-1 and insulin levels were the predictors of NAFLD [16]. Furthermore, IGF-1 was lower in the group with impaired liver function [16]. This clinical image develops in the normal course of pregnancy, and its course varies as per many factors that continue to be investigated in the postpartum period [17-18]. Based on this information, our aim was to investigate whether insulin resistance developed in the patients after pregnancy and examine the effect of breastfeeding on insulin resistance and NAFLD during this period.

Methods

We examined the data of 135 patients aged 20-40 years who have had at least 1 pregnancy and admitted to our polyclinic. Informed consent was obtained from all patients. Measurements of height and weight were taken, BMI was calculated. Number of children and total breastfeeding time were questioned. The patients were asked when they had their last child, and the time from that birth to the evaluation date was recorded. All variables were analyzed for normality. Parametric tests were used for normally distributed variables and nonparametric tests were used for nonnormally distributed variables. T and Mann-Whitney U tests were used for comparing independent variables between the two groups. For three or more groups, ANOVA test and Kruskal-Wallis test were used, and Pearson's and Spearman's correlation tests were used to determine the relationship between two variables. Both univariate and multivariate logistic regression analysis were used to determine risk factors for osteopenia and osteoporosis. p < 0.05 was considered to be statistically significant. The NAFLD score and FIB-4 score, which were used in the evaluation, were calculated with the obtained data. All the procedures in studies involving human participants were performed in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Results

The mean age of 135 female patients included in the study was 34.4 ± 4.8 (21-40) years, the mean number of children was 1.8 ± 0.6 (1-3), and the mean total breastfeeding time was 25 ± 16 (0-72) months. The time from the last birth to the evaluation date was 7.4 ± 5.4 (0-22) years. BMI, NAFLD fibrosis score and Homeostatic Model Assessment for Insulin Resistance were evaluated with respect to breastfeeding periods. Consequently, there was no significant correlation between total breastfeeding time and BMI, NAFLD fibrosis score, HOMA-IR value and HbA1c. Given the first six-month period, which is an important threshold for baby health in breastfeeding, patients were divided into two groups as those breastfeeding for < 6 months and those for > 6 months. When two groups were formed as patients breastfeeding for <6 months and patients breastfeeding for > 6 months, a significant difference in BMI was observed between these two groups (p: 0.02). BMI was 27.2 ± 5.3 in mothers breastfeeding for < 6 months while it was 30.6 ± 6.6 in mothers breastfeeding for > 6 months. There was a significant relationship between BMI and NAFLD fibrosis score (p: 0.00) and HOMA-IR (p: 0.00).

< 6 months		**Duration of breastfeeding**		**Total**
		≥ 6 months		
Number of Children	1	17	28	45
	2	11	53	64
	3	4	17	21
Total		32	98	130

Table 1: Comparison of breastfeeding times by the number of children.

Duration of breastfeeding	< 6 months	≥ 6 months	P value
BMI	30,6(±6,6)	27,2(±5,3)	0,02
HOMA-IR	3,2(±3,6)	1,7(±0.9)	0,15
NAFLD Score	-2,0(±1,2)	-2,4(±1,2)	0,29
FIB-4 Score	0,65(±0,32)	0,65(±0,35)	0,99

Table 2: Comparison of BMI, HOMA-IR, NAFLD AND FIB-4 Score between mothers breastfeeding for less or more than 6 months

With these results, we demonstrated that there is a correlation between BMI and NAFLD and HOMA-IR. Moreover, we observed a correlation between the number of children and FIB-4 score (p: 0.05).

Discussion

Dietary items received above the daily calorie requirement are stored in the adipose tissue and liver. Increased steatosis in the liver and the subsequent hepatocellular ballooning may lead to NASH, which is accompanied by inflammation, and can progress into fibrosis and cirrhosis. NAFLD occurs as a result of > 5% of hepatocytes being affected [2,3]. In 20% of cases, NASH developing with concomitant inflammation can progress into cirrhosis and hepatocellular cancer (HCC) in advanced stages [2,4-7]. Outside HCC, there is an increased risk of extrahepatic cancer [19-21]. NAFLD is examined in four groups. Grade 0 refers to the normal liver. If the number of monitored hepatocytes with steatosis is < 5%, the classification is Grade 1. If it is between 5% and 33%, the classification is Grade 2; if it is between 33% and 66%, the classification is grade 2-3 [3]. NASH is the condition when lobular inflammation and ballooning occurs, in addition to hepatosteatosis. Mortality increases in F2 and F3 before cirrhosis develops [22]. There is evidence that the activation of lactation and increase in duration reduces metabolic parameters and the formation of associated diseases [23, 24]. In this study, we observed that breastfeeding period effectively reduces insulin resistance, particularly in mothers who have completed six months. In a study where measurements in pregnant women were made from the beginning of pregnancy until the postpartum period, the effect of lactation on weight loss during the postpartum period was noted [25]. The overweight group included mothers breastfeeding for shorter time periods [24]. In another study, ensuring complete breastfeeding is effective for weight loss in the postpartum period [26]. The effect of the number of births on weight gain should be considered. Although the weight gain is usually around the abdomen, the weight lost in the initial postpartum period may not be abdominal fat because of the effect and duration of breastfeeding [24,26]. In conclusion, lactation should be maintained for at least six months for maternal health together with the baby's health, and more comprehensive studies should be conducted for long-term data.

Therefore, the development of insulin resistance of women giving birth helps the mother in the first six months with breastfeeding and the result suggests that it has a positive effect on weight loss and liver steatosis. When the two groups were formed based on breastfeeding for 12 months, no significant difference was reported. According to these results, it seems that the first six months are important for the mother as much as the baby. Other studies in the literature that are independently published around the same time as this supports this result [17,18].

In our study, we may not have found a significant correlation between total breastfeeding time and body mass index NAFLD and HOMAIR. This may be due to the low number of cases. However, even in this number of cases, we found a significant correlation with BMI when six months of breastfeeding was considered the threshold. Again, there was a correlation between BMI and NAFLD and HOMAIR. again, there was a correlation between the number of children and FIB4. In conclusion, although our study was not sufficient in number, it yielded results that could be indirectly associated with a significant decrease in BMI and improvement in hepatosteatosis indicators in mothers who breastfed for six months compared to those who breastfed for less than six months.

Conclusion

This study aims to investigate the effect of breastfeeding on non-alcoholic hepatosteatosis in female patients aged 20-40 years old who have given birth. There is contradicting evidence in the literature; we believe that breastfeeding has a protective effect on hepatosteatosis.

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