Evaluation of the Relationship Between Postpartum Cardiac Output of Smoking Women and Birth Weight

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INTRODUCTION

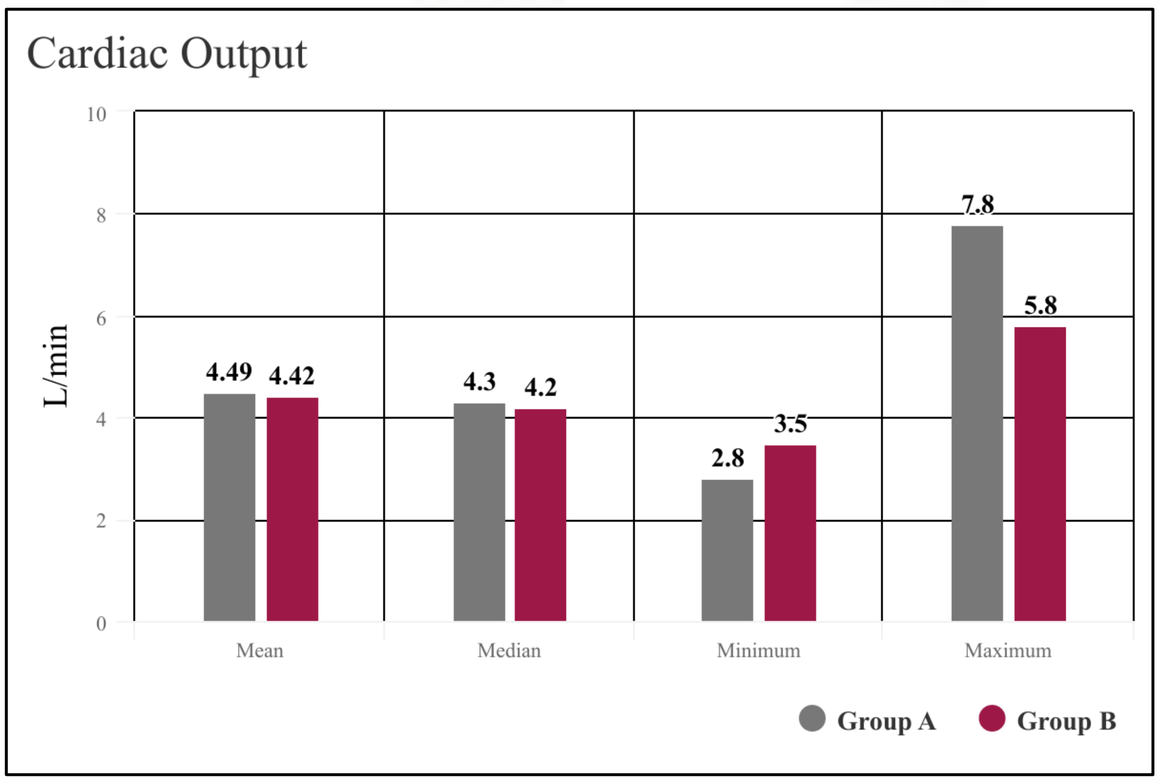
Low birth weight (LBW) has been defined as a birth weight below 2500 grams. The risk of morbidity and mortality among LBW newborns is significantly higher. Maternal cigarette consumption is involved in the etiology of LBW. Although some studies show that smoking affects fetal development by causing uteroplacental insufficiency, the existence of an additional mechanism is not known. Cardiac output (CO) is the amount of blood pumped by each ventricle per minute and is the mechanism that ensures blood flow to vital organs. CO increases from the first trimester of pregnancy and is expected to decrease to preconception levels again after the sixth week postpartum. Also, smoking is known to increase CO in humans by causing a change in the "Beats per minute" component. It has been proved by previous studies that the increase in cardiac output due to smoking develops to increase the decreased oxygen transport to the tissues, but it is not clear whether this compensation mechanism is at a level to prevent complications such as LBW in pregnancy. The study aims to determine the relationship between the postpartum CO of women who smoked during pregnancy and the weight of newborns in their last pregnancy.

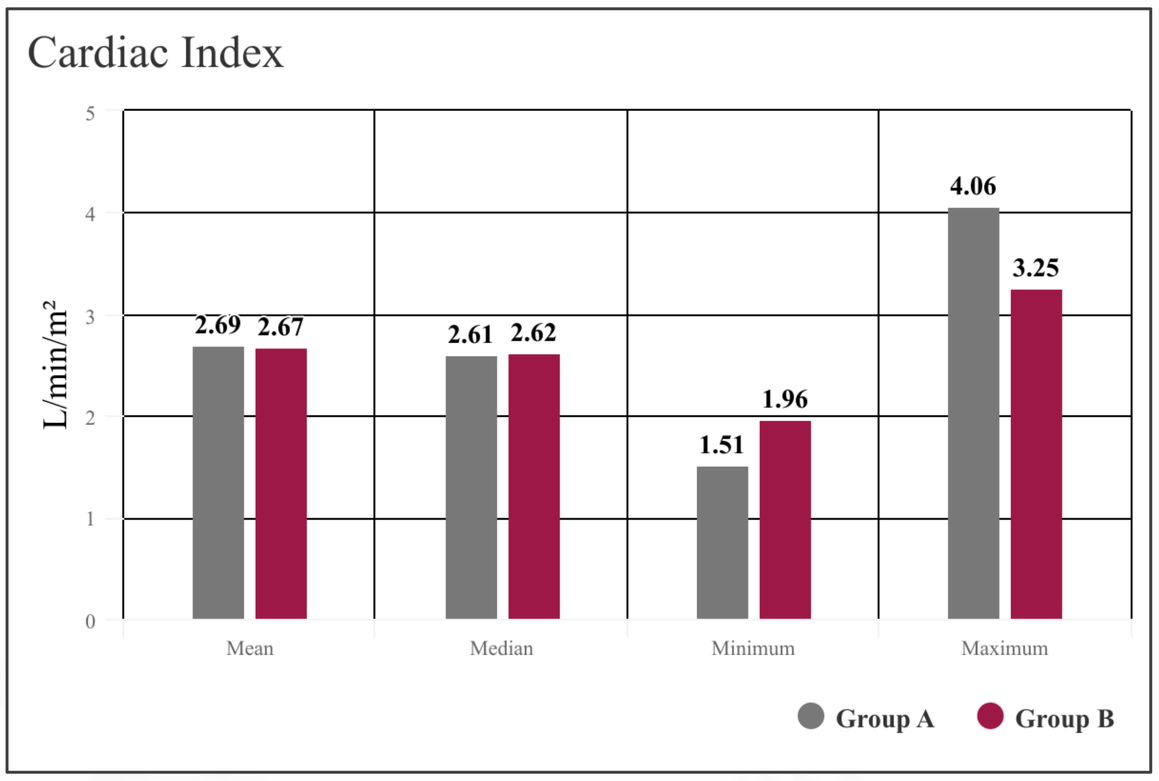
MATERIALS AND METHODS

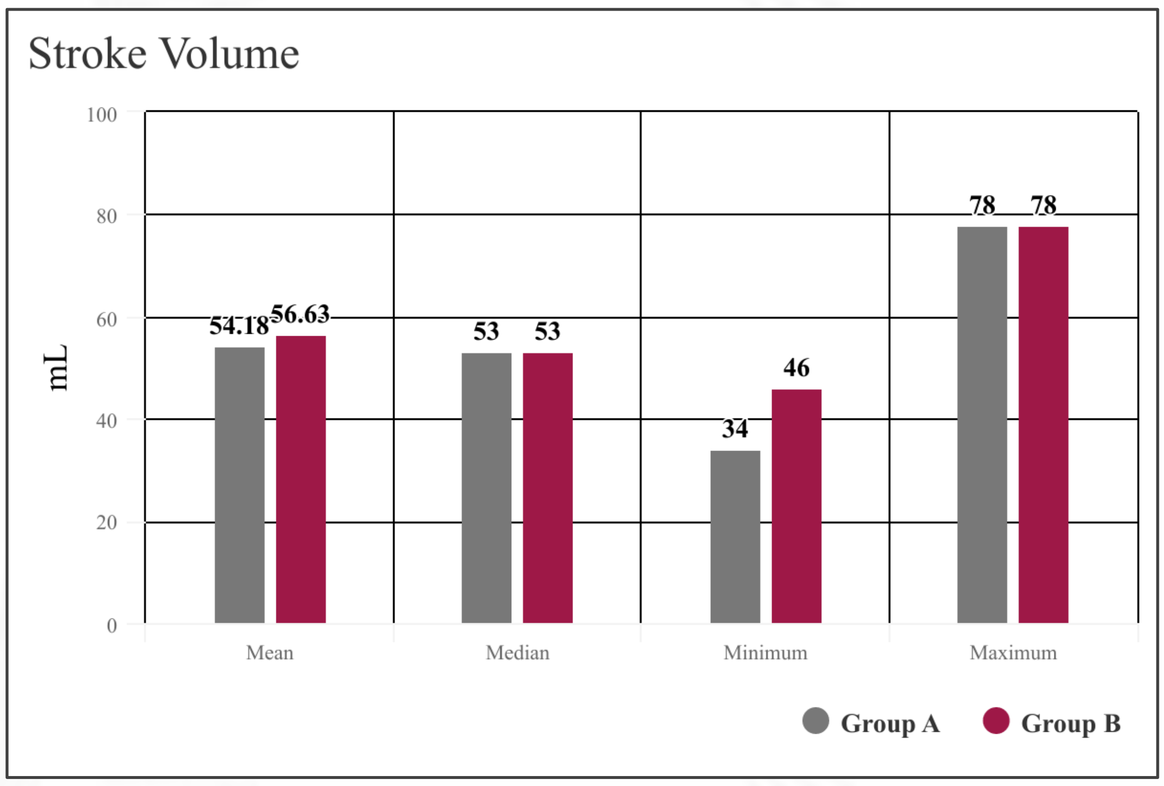
Women who had smoked during pregnancy and whose smoking was proven by a breath carbon monoxide test were included in the study. Cases with a history of chronic hypertension, heart and kidney disease, pregestational diabetes, and thromboembolic disease were excluded from the study. Participants were divided into two groups; Group A consisted of women that gave birth to appropriate for gestational age (AGA) newborns (n: 17) and Group B consisted of women that gave birth to LBW newborns (n: 8). In these cases, echocardiograms were performed after the sixth week postpartum. For the evaluation of the echocardiograms, the recommendations of the American Echocardiography Guidelines were taken into consideration and cardiac outputs of the cases were determined by the formula “Stroke volume (SV) x Heart rate”. The basic demographic data of the study group is expressed as mean ± standard deviation and median (min-max). Variables with asymmetric distribution were compared with the Mann-Whitney U test. Non-parametric correlations were evaluated with Spearman's Rho test.

RESULTS

Totally 25 female patients were included in this study. Echocardiography was performed on cases. The mean birth weights of Group A and Group B were 3285 grams vs 2300 grams ($p < 0.001$), respectively. No statistically significant relationship was found between the birth weight of the newborns and the postpartum Cardiac Output, Cardiac Index, Stroke Volume, and Stroke Volume Index of the cases ($p > 0.05$).







CONCLUSION

The study indicates that postpartum cardiac output measurements are not related to the birth weights of newborns. The deleterious effects of smoking on fetal growth seem to occur by means of the fetal-placental mechanism rather than maternal cardiac function. Nevertheless, comprehensive studies involving more people are required for the results to be meaningful.

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