

Investigation of Serum Lipid Levels During Mid-trimester Prostaglandin Induced Abortion

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Abstract : Concentrations of serum lipids rise during the progression of gestation, reaching the peak at the end of pregnancy. Although these changes are reversible, the possible influence of elevated serum lipids on atherosclerotic and ischemic cardiovascular disease as well as biliary tract lithiasis development is still unresolved. The aim of this study was to investigate concentrations of serum lipids during mid-trimester pregnancy abortion induced by PGF₂_α. Blood samples were taken four times: from the cubital vein of 30 women, aged from 15-40, admitted for mid-trimester pregnancy abortion I. before intramuscular application of PGF₂_α (control) and II. three hours after, in the active phase of abortion (III) and twelve hours after the curettage (IV). Quantitative assay was used for determination of total cholesterol, triglycerides, phospholipids, LDL and HDL, while apolipoprotein A1 and apolipoprotein B were determined by immunochemical methods. Three hours after prostaglandin administration levels of triglycerides, LDL and apolipoprotein B were higher, while other lipids were lower, compared to the control group. During the abortion's active phase all lipid concentrations were higher, compared to the control but only HDL lipoproteins were lower. Twelve hours after curettage serum lipid concentrations had decreased, reaching control levels; only serum triglycerides were higher. Apolipoprotein A1 and apolipoprotein B were supposed to have a protective role against atherosclerotic process and biliary tract diseases development. (Thai J Obstet Gynaecol 1991;3:85-88.)

Key words: mid-trimester pregnancy abortion, prostaglandins, serum lipid levels

According to the literature about half of pregnancies are terminated by abortion despite a bulk of investigation in medical sciences. During only one year about 35-55 million abortions are performed in the world while 84000 of women die due to pregnancy interruption complications⁽¹⁾.

It is also well known that mid-trimester pregnancy abortion has a twenty times higher morbidity and mortality risk compared to a first trimester abortion⁽²⁾.

Elevation of serum lipid levels during pregnancy is progressive and reversible⁽³⁾. Previous investigations

confirmed that serum lipid concentrations rise during mid-trimester pregnancy abortion induced by hypertonic saline solution and proposed that their investigation may be of use for the study of arterosclerotic and ischemic cardiovascular disease as well as for biliary tract lithiasis development⁽⁴⁾. So, the aim of this research was to investigate serum lipid levels during mid-trimester pregnancy abortion induced by PGF_{2α} and the possible role in pathogenesis of those diseases.

Materials and Methods

The study comprised of 30 women, aged from 15-40, without any endocrine or metabolic disorders admitted for mid-trimester pregnancy abortion for social reasons.

After routine investigations on admission, gestational age was assessed by gynaecological and ultra-

sonographic examinations. Peripheral blood samples from cubital vein were taken four times: before intramuscular application of PGF_{2α} (I) (control group) and three hours after that (II), in the active phase of abortion (III) and twelve hours after the placental expulsion and curettage (IV). The levels of total cholesterol, triglycerides, phospholipids, LDL and HDL were investigated by quantitative assays while concentrations of apolipoprotein A1 and apolipoprotein B were determined by immunochemical methods. Obtained data were tested by variance analysis for attributive parameters.

Results

Serum lipid levels during mid-trimester pregnancy abortion induced by PGF_{2α} are shown in Figure 1.

	Before PG application	3h after PG application	During abortion's active phase	12 hours post abortion
Cholesterol (mmol/1)	6.50 +/- 1.09	6.28 +/- 0.72	7.07 +/- 1.31	6.85 +/- 1.35
Triglycerides (mmol/1)	2.04 +/- 0.70	2.59 +/- 0.72	2.35 +/- 0.43	2.57 +/- 0.62
Phospholipids (mmol/1)	3.26 +/- 0.32	3.21 +/- 0.24	3.56 +/- 0.37	3.20 +/- 0.24
LDL (mmol/1)	3.57 +/- 1.06	3.83 +/- 0.74	4.38 +/- 1.25	4.30 +/- 0.99
HDL (mmol/1)	1.81 +/- 0.55	1.26 +/- 0.21	1.62 +/- 0.44	1.40 +/- 0.63
Apolipoprotein A1 (g/l)	1.92 +/- 0.17	1.70 +/- 0.19	1.96 +/- 0.35	1.56 +/- 0.31
Apolipoprotein B (g/l)	1.51 +/- 0.35	1.55 +/- 0.31	1.70 +/- 0.37	1.60 +/- 0.47

Fig. 1 Serum lipid levels during mid-trimester pregnancy abortion induced by PGF_{2α}.

Concentrations of triglycerides, LDL and apolipoprotein B were slightly higher three hours after intramuscular application of PGF_{2α} compared to the controls, while levels of other investigated lipids were lower, but not significantly ($p > 0.05$).

During the active phase of abortion serum lipid levels were higher compared to the controls, while HDL lipoproteins were significantly lower ($p < 0.05$).

Twelve hours after the placental expulsion and curettage, serum lipids were decreased compared to the previous respective sample concentrations; only serum triglycerides were higher, but not significantly ($p > 0.05$). Serum lipid levels in this postabortal phase were comparable to those before the prostaglandin application.

Discussion

There is a relatively small amount of investigations of serum lipid levels during mid-trimester pregnancy abortion. Changes of serum lipids during the abortion active phase is due to the stress effect on pituitary-adrenal axis, and elevation of ACTH and cortisol concentration in serum⁽⁵⁾.

In healthy persons, during pregnancy, there is a steady and significant increase of serum cholesterol levels and LDL lipoproteins, but also a decrease of HDL lipids. Maximal serum lipid concentrations are registered between 33-36 weeks of gestation⁽³⁾. Jimenez et al⁽⁶⁾ found that HDL is in negative correlation with cholesterol

and triglycerides during the second half of gestation. Our investigation confirmed significantly lower HDL levels after application of PGF_{2α}. This finding may indicate a protective role of HDL in atherosclerosis and ischemic myocardial disease development, but biochemistry of this protective mechanism is still unclear⁽⁷⁾. Steady increase of serum cholesterol levels during gestation are due to progressive concentration rise of LDL. Composition of these lipoproteins is changed and manifested in decreased ratio of cholesterol and apolipoprotein B⁽⁸⁾. This finding is not in correlation with estrogen and progesterone levels rise. Phospholipids are very important for metabolism of arachidonic acid, as precursors of prostaglandins, prostacyclins and thromboxans⁽⁹⁾. Increase of serum phospholipid concentrations that we found is due to degenerative and necrotic changes in feto-placental compartment. Apolipoprotein A1, constitutive part of HDL and chilomicrons, stimulates hepatic lipoprotein lipase and is very important in cholesterol and HDL metabolism⁽¹⁰⁾. Clinical value of apolipoprotein A1 determination is still unresolved, but we found that it's concentrations were lower after the abortion procedure was completed compared to those before the prostaglandin application. We propose that it has, besides a HDL, a protective role in atherosclerosis and ischemic myocardial disease as well as biliary tract lithiasis development. Zannis and Brseslow⁽¹¹⁾ regarded that concentrations rise of apolipoprotein B

is due to LDL binding to their specific receptors. The most recent studies have indicated that elevated apolipoprotein B is more important for atherosclerotic change development in blood vessels than decreased concentration of HDL⁽⁷⁾.

In conclusion one can say that serum lipid levels require further investigation for elucidation of pathophysiological changes during pregnancy as well as for cardiovascular and biliary tract diseases commencement.

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