EFFECT OF INTRA AMNIOTIC SALINE AND PROSTAGLANDIN ON FIBRINOLYTIC ACTIVITY, PROTHROMBIN TIME AND SERUM ELECTROLYTES – A COMPARATIVE STUDY

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Summary : Effects of intra-amniotic instillation of hypertonic saline and prostaglandin F2 alpha for medical termination of pregnancy were studied. Fibrinolytic activity significantly increased at 4 hr and 24 hr after hypertonic saline but only at 24 hrs after prostaglandin. There was no significant change in prothrombin time after hypertonic saline but significant increase was observed after prostaglandin. In both the cases serum sodium level did not show any significant change. Serum potassium level significantly decreased at 24 hrs after hypertonic saline but no change was observed after prostaglandin.

Key words : intra-amniotic hypertonic saline, intra-amniotic prostaglandin, fibrinolytic activity, prothrombin time, serum electrolytes

INTRODUCTION

After legalization of abortion, the commonest method used for termination of pregnancy after first trimaster was intramaniotic instillation of hypertonic saline. Japanese used this technique extensively from 1946-50. They subsequently abondoned it because of associated complications including maternal death. The etiologic factors were hemorrhage, infection, preexistent cardiovascular or renal disease (6).

Different workers have observed different changes in clotting factors after intraamniotic instillation of hypertonic saline. Brenner *et al.* (2) and Weiss *et al.* (12) have observed that there is defibrination syndrome. Franklin D. Brown (4) observed defibrination syndrome only in one case, his other cases showed only decrease in platelet count, factor VIII, profibrinolysin and fibrinolytic inhibitor. Some (8, 10) have observed decreased platelet count, decreased fibrinogen level and increased prothrombin time. According to Richard W. Stander (10), placenta being a rich source of thromoboplastin causes defibrination and deposition of fibrin in pulmonary vessels. Intraamniotic saline instillation also causes changes in serum electrolytes (3).

Other method used to induce abortion after first trimaster in intraamniotic instillation of prostaglandin F2 alpha. No significant changes in clotting factors (3, 7) and fibrinolytic activity (7) occur with this method.

The present study was undertaken to compare the effects of intraamniotic instillation of hypertonic saline and prostaglandin on fibrinolytic activity, prothrombin time and serum electrolytes.

MATERIALS AND METHODS

Nineteen cases of intra-amniotic instillation of hypertonic saline (200 *ml* of 20%) and 11 cases of intraamniotic instillation of prostaglandin F2 alpha (3 doses each of 25 *mg* at interval 6 hrs) for medical termination of pregnancy were studied. In each case 3 blood samples were taken. First sample before, 2nd sample after 4 hrs and 3rd sample 24 hrs after instillation of intraaminotic hypertonic saline or prostaglandin F2 alpha. With each blood sample following investigations were performed.

(1) Prothrombin time by modified Quick's method (9).

(2) Fibrinolytic activity by Fearnley's method (5).

(3) Serum Na^+ and K^+ by flame photometer (11).

RESULTS

After intraamniotic instillation of hypertonic saline, the increase in fibrinolytic activity (decreased clot lysis time) was statistically significant ($P<0.01$) both at 4 hours and at 24 hours. However, there was no significant change in prothrombin time or serum sodium levels ($P>0.05$). The serum potassium level showed a decrease at 24 hours that was statistically significant. ($P<0.01$) but not at 4 hours (Table I).

After intra amniotic prostaglandin F2 alpha instillation, the increase in fibrinolytic activity (decreased clot lysis time) was statistically significant at 24 hours ($P<0.01$) but not statistically significant at 4 hours ($P>0.05$). Increase in prothrombin time was statistically significant both at 4 hours and 24 hours ($P<0.01$). There was no significant change in serum sodium and serum potassium levels ($P>0.05$).

Majority of cases with both the methods aborted 24 hours after intra-amniotic instillation. Hence the results can not be attributed to effects of abortion.

TABLE I : Dilute blood clot lysis time, prothrombin time, serum sodium and serum potassium levels initially, at 4 hours and 24 hours following intra-amniotic saline injection n=19.

Sample	*Clot lysis time Mean (hrs)* ± *S.D.*	*Prothrombin time Mean (secs)* ± *S.D.*	*Serum sodium level Mean (mEq/l)* ± *S.D.*	*Serum potassium level Mean(mEq/l)* ± *S.D.*
1	4.53±0.235	14.1 ±2.73	139.84±2.65	5.89±1.18
2	4.29±0.233	13.63±4.12	139.99±2.49	5.43±0.96
3	4.17±0.277	14.11±4.66	139.71±3.38	5.08±0.82

TABLE II : Dilute blood clot lysis time, prothrombin time, serum sodium and serum potassium levels initially, at 4 hours and 24 hours following intra amniotic prostaglandin F2 alpha injection n=11.

Sample	*Clot lysis time Mean(hrs)* ± *S.D.*	*Prothrombin time Mean(secs)* ± *S.D.*	*Serum sodium Mean (mEq/l)* ± *S.D.*	*Serum potassium level Mean(mEq/l)* ± *S.D.*
1	4.47±0.283	13.27±3.19	138.78±2.52	5.62±1.71
2	4.28±0.339	15.82±6.05	139.14±2.84	5.16±0.789
3	4.09±0.373	15.82±6.01	138.25±3.25	5.08±0.654

DISCUSSION

For medical termination of pregnancy, intra-amniotic instillation of hypertonic saline or prostaglandin is used. With hypertonic saline occasionally, complications e.g. haemorrhage, intravascular clotting occur probably due to absorption of toxic products from damaged tissue. Bonnar *et al.* (1) showed an increased plasminogen level in the third trimester of pregnancy. But in late pregnancy and in labour, there was diminished plasminogen levels and hence diminished capacity to lyse fibrin which ensured rapid haemostasis in uterus during labour. Also though the plasminogen activator levels decreased in labour, a rise was observed during first week of puerperium. This indicates that tissue damage increases the fibrinolytic activity. In the present study, results show that with hypertonic saline, fibrinolytic activity increases at 4 hours whereas with prostaglandin it increases at 24 hrs. This indicates that with saline, tissue damage occurs much earlier than with prostaglandin.

There is no significant change in prothrombin time after hypertonic saline but it increased significantly with prostaglandin. This indicates that changes in fibrinolytic activity are not secondary to change in clotting mechanism but probably a direct effect of absorption of toxins from damaged tissue.

Results show that there is not significant change in serum sodium level at any time, either with saline or with prostaglandin. Potassium level decreases significantly at 24 hrs only in case of hypertonic saline. Brewer *et al.* (3) have shown increased serum levels of sodium chloride after instillation of hypertonic saline. However, our results do not confirm this finding since no significant increase in sodium levels were observed. The serum potassium levels decreased at 24 hrs after saline. It is probable that as sodium chloride is introduced, volume of amniotic fluid may expand causing a decrease in potassium concentration with subsequent influx of potassium from the circulation. This may explain the lowered potassium levels. Estimation of potassium level in amniotic fluid may prove this point.

Comparing the results of two methods, intra-amniotic hypertonic saline causes tissue damage earlier than prostaglandin. Therefore, prostaglandin method resembles more with natural mode of termination and is safer. However, this needs further confirmation.

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