

**INTRA—AMNIOTIC SALINE
INSTILLATION FOR TERMINATION OF SECOND
TRIMESTER PREGNANCY******

by

AJIT MEHTA,* M.D.,

NAVIN POPAT,** M.D., F.C.P.S., D.G.O., D.F.P.

and

B. N. PURANDARE,*** M.D., F.R.C.S., F.R.C.O.G., F.C.P.S., F.A.M.S.

The need for a better and safer method of termination of second trimester pregnancies has increased, specially so after the Medical Termination of Pregnancy Act. (April 1972).

The different methods of termination of pregnancy in the second trimester are:

(a) Intra-amniotic injection of (i) hypertonic saline, Aburel (1939) (Quoted by Fuchs) and Bracken *et al*, (1972), (ii) hypertonic 50% glucose Brosset (1958), (iii) 40% formalin, Boero (1939) (Quoted by Fuchs), (iv) Prostaglandins E₂ and F_{2x}, Brenner *et al* (1972), Karim *et al*, (1972), (v) Distilled water, Parikh (1972), (vi) Urea, Craft and Musa (1971), (vii) 0.1% Rivanol, (6, 9—diamino—2—oxyethyl acridine lactate), Manabe (1969).

(2) Intra-uterine instillation of Prostaglandins, Bygdeman *et al*, (1972) and Embrey *et al*, (1972).

(c) Intra-venous Prostaglandins, Anderson *et al*, (1972), Karim *et al* (1970).

(d) Intra-vaginal Prostaglandins, Brenner *et al* (1972), Karim *et al* (1971).

(e) Foreign bodies in uterine cavity like catheter, bougie, metreurynter, Manabe (1969).

(f) Abdominal or vaginal hysterotomy.

(g) Laminaria tents and oxytocin drip, and

(h) Combinations of the above methods.

The mechanism of action of intra-amniotic 20% saline instillation is not clearly understood. The following events however occur after instillation of hypertonic saline. (1) Death of the foetus because of electrolyte imbalance, (2) osmotic death of the trophoblastic cells, and (3) progesterone production drops to less than 30% within eight hours. All these factors interact and the products of conception are expelled from the uterus after an interval of 18 to 48 hours.

Since first April 1973 to 31st October 1973, at Nowrosjee Wadia Maternity Hospital and The Post-Graduate Training and Research Centre, 110 second trimester terminations received 20% hypertonic saline intra-amniotically. The analysis of these 110 patients is presented here.

Material and Methods

Out of 140 cases of second trimester terminations, 110 were selected for saline method. These patients were between 14 and 20 weeks, and all of them required terminations under the new Medical Termination of Pregnancy Act. Sterilised

*Honorary Assistant Visiting Obstetrician & Gynaecologist.

**Registrar.

***Dean.

Nowrosjee Wadia Maternity Hospital, Parel, Bombay 400-012.

****Paper read at the 2nd conference of Bombay Obst. & Gynec. Society, Dec. 1972.

Received for publication on 21-6-73.

solution of 20% saline was prepared in the hospital laboratory.

Two methods of instillation were employed during this period. (i) Aspiration of substantial quantity of amniotic fluid followed by the instillation of the saline solution using a bivalve syringe (35 cases); and, (2) instillation of saline without aspiration of liquor amni, by a rapid drip method, as soon as it was established that the needle tip is within the amniotic sac. (71 cases). The quantity of instillation by the former technique varied from 80 to 300 ml., whereas in the latter technique, irrespective of gestation, 150 ml. (30 gm of salt) was instilled. There were four cases of technique failures.

All the patients were hospitalised and they received prophylactic antibiotics. In the hope of reducing the induction-abortion time oxytocin drip was set up immediately following the saline instillation in 27 cases. A case was considered as successfully induced if complete or incomplete abortion was achieved in 96 hours.

Analysis of Cases

Out of a total of 618 abortions carried out since 1st April 1972, 140 cases were above 12 weeks. Table I shows the diffe-

TABLE I
Showing the Methods of Terminations and Number of Cases

Total number of abortions:	618
Second trimester abortions:	140
<hr/>	
Methods for 2nd trimester	Cases
20% Hypertonic saline	110
50% glucose	1
Distilled water	4
Introduction of catheter	2
Prostaglandin E2-F2x	9
Dilatation and curettage	7
Abdominal hysterotomy	6
Vaginal hysterotomy	1
<hr/>	
Total	140

rent methods employed as a primary procedure for second trimester terminations. In 110 of these 140 cases, 20% hypertonic saline instillation was done. It will be noted that the saline method was most consistently used, followed by prostaglandins and hysterotomy. The other methods were employed more for academic interest.

The second trimester termination seemed to be more a problem of young unwed girls, as 50 of these 110 cases belonged to this category.

Table II shows the gravidity versus the

TABLE II
Showing Age Versus Gravida

Age	Gravida					Total
	I	II	III	IV	IV+	
15-17	7	-	-	-	-	7
18-20	24	1	1	-	-	26
21-23	10	7	-	-	-	17
24-26	9	6	9	6	1	31
27-29	-	1	1	1	2	5
30-32	-	-	2	5	4	11
32+	-	-	1	2	10	13
Total	50	15	14	14	17	110

age of the patients. Fifty Cases were primigravidae and all of them were unmarried; thirty-one of these were 20 years or less of age. Fifty cases were below the age of 23 years; and 24 patients were belonging to the higher age—gravity group. The median age of the patients was in the 24-26 years range.

The detailed distribution of the 110 cases according to the period of gestation and outcome can be seen from Table III.

against the instillation—abortion time. Seven women did not abort in the stipulated 96 hours period. Amongst 99 successfully terminated cases, 28 aborted within 24 hours, 45 between 24-36 hours and 18 between 36-48 hours, and the remaining eight aborted between 48 to 96 hours. Thus, the large majority aborted between 24 and 48 hours.

It was observed that uterine activity usually began about six to twelve hours

TABLE III

Showing Quantity of 20% Saline Instilled at Different Gestational Age Groups and the Number of Failures in Each Group

Weeks of gestation	Quantity of 20% saline instilled in ml.						Total Number of Cases	Number of Failures
	<100	101-125	126-150	151-200	201-250	>250		
13-14	9	-	8	1	-	-	18	2
15-16	5	3	22	2	-	-	32	2
17-18	1	1	14	1	-	-	17	2
19-20	4	2	21	5	5	2	39	1
Total	19	6	65	9	5	2	106 + 4*	7 + 4*
No. of Failures	3	-	3	-	1	-	7 + 4*	11

* 4—Technique failures.

Nineteen cases were between 14 and 15 weeks. The maximum number was at 20 weeks, and the outcome was most favourable at this period.

In four cases instillation could not be carried out because of blood stained taps. These have been excluded from further analysis. The quantity of saline injected in the remaining 106 cases in the different gestational age group can also be noted from Table III. It will be observed that the majority of the cases had 126-150 ml. instilled. Further more the quantity of instillation was not determined by period of gestation, when the latter was 15 weeks or more.

Instillation—Abortion Interval

Table IV shows the number of cases

TABLE IV

Showing the Number of Cases Aborted in the Time Intervals

Duration in hours	No. of cases
12 and Less	5
12-18	8
18-24	15
24-30	16
30-36	29
36-48	18
48-96	8
Failed	7
Total	106

before the actual abortion took place, and the cervix generally dilated rapidly since the beginning of uterine activity. The pa-

tients remained comfortable till the onset of uterine activity.

Oxytocin drip was administered with a view to hasten the abortion in 27 cases; in twelve by titration method starting with 40 milli-units per minute and reaching a maximum of 96 milli-units per minute; in the remaining 15 cases a continuous drip of 20 to 50 milli-units per minute was used. The experience with simultaneous oxytocin drip was not encouraging. The induction abortion time was not significantly reduced, and the patients were quite uncomfortable with continuous intravenous infusion.

The abortion was complete without additional procedure in 88 cases, while it was incomplete in 11; blunt curettage was done in eight women under analgesia, while in three cases digital separation and removal was carried out.

Complications and Side Effects

The following side effects were observed in the 110 patients.

(i) Temporary reactionary fever was noted in 14 patients within 24 to 48 hours of instillation; in none of these was there evidence of any infection.

(ii) Two patients had convulsions, one within an hour of instillation and the other more than eight hours after

instillation. Convulsions in the first case could have been due to saline, but in the second case convulsions were due to epilepsy.

(iii) In eleven instances there were blood-stained taps initially but clear liquor was obtained on a repeated attempt.

In no case was there a haemorrhagic disorder or post-abortal excessive bleeding.

Analysis of Failure

In four cases liquor could not be aspirated and only blood taps were obtained. These were considered as technique failures. One of them aborted later a molar pregnancy spontaneously. Two cases were subsequently given intravenous pitocin and prostaglandin E₂ infusions, respectively with success. Hysterotomy with ligation of the tubes was performed in the fourth case.

Seven patients failed to abort within 96 hours time after successful instillation. Dilatation and curettage was done in two cases and hysterotomy with ligation of the tubes was performed in three cases. One aborted by pitocin drip (titration method) and the remaining one aborted spontaneously after 26 days. The details of these cases are shown in Table V. It

TABLE V
Showing Analysis of Failure

Nature of failure	Final Termination	Number of Cases
Technique	Spontaneous evacuation, molar pregnancy	1
"	Pitocin drip by titration	1
"	Intra-venous PGF _{2x}	1
"	Hysterotomy with sterilisation	1
Method	Dilatation and curettage	2
"	Hysterotomy with sterilisation	3
"	Pitocin drip by titration	1
"	Spontaneous abortion after 26 days	1
	Total	11

was not the practice then at Nowrosjee Wadia Maternity Hospital to repeat saline instillation if it failed once.

Discussion

Newton (1971) states that after about 15 weeks, saline instillation is the preferred method for termination of pregnancy. Between 12 and 15 weeks, termination is best postponed until uterus is of adequate size for intra-amniotic saline instillation. According to Gochberg and Reid (1966) failure to obtain amniotic fluid before 15 weeks may be attributable to the fact that the foetal membranes are not juxtaposed to the uterine wall until the end of the fourth month. In all reported series most failures are prior to the fifteenth week of gestation.

In the experience gathered at Nowrosjee Wadia Maternity Hospital, it was felt that it was not essential to localise the placenta prior to the intra-amniotic puncture. In the present work one in every ten cases had blood stained tap; this incidence was reduced as more experience was gathered. In order to avoid blood taps or blood stained aspiration it was found essential to make a smart puncture straight into the sac.

Fuchs (1967) while describing the technique states that general anesthesia should not be given and that no instillation should be done unless a clear amniotic fluid is obtained; a maximum amount of 20% saline to be instilled is 200 ml., only three attempts at puncture be made and 50% glucose is not to be used because of risk of anaerobic infection.

The termination in second trimester is the problem of young unmarried girls because of delayed disclosures of pregnancy to parents, or conception resulting from ignorance in sexual matters. Sometimes patients delay approaching

doctors out of fear, ignorance or anxiety of future health.

In case where sterilisation is indicated there is no need for hysterotomy as sterilisation can be done after she has aborted, as these abortions are like spontaneous abortions. In the present series tubal ligation was performed in 31 cases and vasectomy was performed in 2 cases out of 99 successfully induced cases.

Experience at Wadia Hospital indicated that hysterotomy should not be done as a primary procedure.

Majority of the abortions took place between 24 to 48 hours. The cumulative percentages of aborted cases within specific time limits are shown in Table VI where the results are compared with

TABLE VI
Showing the Cumulative Percentage of
Aborted Cases with Initiation-Abortion Time.

Duration in hours	Wagner %	Present study %
24 and less	15	25
24 to 36	66	70
36 to 48	85	86
48 to 96	98	93

that of Wagner (1962). The results in both the series are comparable. The present work collaborated the observation of Wagner that simultaneous oxytocin drip is of no value in hastening the abortion. Wagner states that probably less than half required curettage to complete. At Nowrosjee Wadia Maternity Hospital curettage was necessary in only 15% of the cases.

Wagatsuma (1965) discussed the complications of the procedure, especially maternal death, and further experience was enough to condemn the procedure. In support of the safety of the saline procedure Wagner and his associates in

Copenhagen have reported 330 cases of intra-amniotic saline without serious mishap. Gochberg and Reid (1966) after reviewing more than 900 cases in literature conclude. "All reports confirm the observation that intra-amniotic hypertonic saline is an effective and safe technique for termination of pregnancy."

Cameron and Dayan (1966) do not condemn the method, but say that it should be used with caution; hypernatremia is the complication to be avoided. The precautionary measures advised by them are (a) be absolutely certain that the point of the needle is in the amniotic cavity, and (b) inject the saline solution very very slowly.

Summary and Conclusion

Instillation of the hypertonic solution was the method used in 110 cases at Nowrosjee Wadia Maternity Hospital. The remarkable success rate of over 90 per cent, the high number of spontaneous evacuations obtained within 96 hours, and the astonishingly low complication rate in the series proves beyond doubt the usefulness and safety of the 20% saline instillation in the second trimester terminations.

The above findings further indicate that hysterotomy as a primary procedure for second trimester termination is not justifiable.

Acknowledgements

The authors wish to thank all the honorary medical staff of N. W. M. Hospital for co-operating in the study, all the resident doctors for looking after the patients of saline instillation, and the family planning unit for the referrals.

References

1. Aburel, E.: *Obst. & Gynec.*, 33: 729, 1969.
2. Anderson, G. G., Hobbins, J. C., Speroff, L. and Caldwell, B. U.: *Contraceptions*. 5: 303, 1972.
3. Bracken, M. B., Hachamovitch, M. and Grossman, G.: *Am. J. Obst. & Gynec.*, 114: 10, 1972.
4. Brenner, W. E., Bracksma, J. T., Fishburne, J. I., Kroncke, F. G., Hendricks, C. H. and Staurovsky, L. G.: *Obst. & Gynec.*, 39: 628, 1972.
5. Brenner, W. E., Hendricks, C. H., Bracksma, J. T., Fishburne, J. I. and Staurovsky, L. G.: *Prostaglandins* 1: 455, 1972.
6. Brosset, A.: *Acta Obst. & Gynec. Scand.*, 37: 519, 1958.
7. Bygdeman, M., Beguin, F., Topozada, M., Wiquist, N. and Bergstrom, S.: *Lancet*, 1: 1336, 1972.
8. Cameron, J. M. and Dayan, A. D.: *Brit. Med. J.*, 1: 1010, 1966.
9. Craft, I. and Musa, B.: *Lancet*, 2: 1058, 1971.
10. Embrey, M. P., Hillier, K. and Mahendran, P.: *Brit. Med. J.*, 3: 146, 1972.
11. Fuchs, F.: *Advances in Obst. & Gynec.* Vol. I Edited by Marcus, S. L. and Marcus, C. C. The Williams and Wilkins Co. Baltimore P. 258: 1967.
12. Gochberg, S. H. and Reid, E. D.: *J. Obst. & Gynec.*, 27: 648, 1966.
13. Karim, S. M. M. and Sharma, S. D.: *Lancet*, 2: 47, 1971.
14. Karim, S. M. M. and Filshie, G. M.: *Brit. Med. J.*, 3: 198, 1970.
15. Karim, S. M. M. and Sharma, S. D.: *J. Obst. & Gynec. Brit. Cwlt.*, 78: 294, 1971.
16. Manabe Y.: *Am. J. Obst. & Gynec.*, 105: 132, 1969.
17. Manabe, Y.: *Am. J. Obst. & Gynec.*, 103: 232, 1969.
18. Newton, B. W.: *J. Post. Grad. Med.*, 50: 213, 1971.
19. Parikh, M. N.: *Personnel Communication* (Dec. 1972).
20. Schulman, H., Kaiser, I. H. and Randolph, G.: *J. Obst. & Gynec.*, 37: 521, 1971.
21. Wagatsuma, T.: *Am. J. Obst. & Gynec.*, 93: 743, 1965.
22. Wagner, G., Karker, H., Fuchs, F. and Bengtsson, L.: *Danish. Med. Bull.*, 9: 137, 1962.