INTRAUTERINE INJECTION OF 20% SALINE FOR INDUCING ABORTION

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SYNOPSIS

The result of a prospective study of intrauterine injection of 20% saline for terminating mid-trimester pregnancy and review of literature is presented. Of the 24 cases who had intrauterine saline injection, all aborted within 49 hours after injection.

The hysterotomies besides carrying the risks of a major abdominal operation, had a high incidence of post-operative morbidity. With intrauterine saline injections only one patient had transient symptoms of hypernatremia. The duration of hospital stay for cases terminated by intrauterine saline injection is half that of hysterotomies.

In our opinion, with adequate precaution, intrauterine saline injection is a safe and effective method for terminating mid-trimester pregnancies and is superior to hysterotomy for those patients who want to preserve reproductive function.

Before legalisation of abortion only two to three therapeutic abortions for medical reasons were carried out each year in Kandang Kerbau Hospital, and these were usually for pregnancies in the first trimester. The choice of method was not a problem. Almost invariably dilatation and curettage was the method used, although other methods were used by "quack abortionists". Since the legalisation of abortion in April 1970, the problem of choice of method for terminating mid-trimester pregnancies arose.

During the first seven months after legalising abortion about 1,000 legal abortions were carried out in Kandang Kerbau Hospital and Thomson Road General Hospital. The University Unit alone performed 382 abortions of which 323 were first trimester pregnancies (12 weeks and below) and these were terminated by dilatation and curettage. The remaining 59 cases were pregnancies beyond 12 weeks gestation. Of these, 35 cases were terminated by hysterotomy and 24 by intrauterine injection of 20% saline. Hysterotomy has been for a long time the accepted method for terminating mid-trimester pregnancies. However, during the last 5 years, intrauterine injection of 20% saline is replacing hysterotomy in Scandinavian countries and some East European countries. The problem of inducing abortion is new to us in Singapore, and hysterotomy is still the generally the accepted method. There is still a great deal of reservation toward intrauterine injection of hypertonic saline.

In order to see for ourselves the efficacy and safety of intrauterine injection of 20% saline, a prospective study was carried out. A preliminary report on our experience with 24 such terminations and 35 hysterotomies carried out during the period between 2nd April 1970 and 12th November 1970, is presented.

MATERIAL AND METHOD

Patients with pregnancies more than 12 weeks (by uterine size) for termination, were divided into two groups. One group consisted of patients who were to have abdominal sterilization at the same time and the other group consisted of patients not for sterilization. The first group were terminated by abdominal hysterotomy and the second group by intrauterine injection of 20% saline, provided the latter did not have heart disease, liver disease, renal disease and hypertension.

Age and Parity

TABLE I

Age in Years	Number of Cases
<20	5
21 - 30	11
31 - 40	6
41 - 45	2
TOTAL	24

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TABLE II

Parity	Number of Cases
0	5
1 - 2	5
3 - 8	14
TOTAL	24

TABLE III

Gestation (Uterine Size)	Number of Cases
12 weeks	3
14 weeks	13
16 weeks	7
18 weeks	1
TOTAL	24

Technique of Injection

No special pre-operative preparations were carried out. Only atropine was given to the patient as pre-medication. The bladder was catheterised and abdomen cleaned with an antiseptic and draped with sterile towels. The skin and subcutaneous tissues directly over the middle of the body of the uterus was infiltrated with 2 ml. of lignocaine (1%).

Amniocentesis was performed with a size 18 infiltration needle and liquor withdrawn. The amount withdrawn depended on the size of the uterus. Only 10 to 20 ml. of liquor was withdrawn for those pregnancies between 12 to 14 weeks, because in trying to obtain more liquor an embarassing situation may arise when no more liquor could be aspirated and the operator will find it difficult to tell if the needle is still in the amniotic cavity. With the needle in the same position between 100 to 200 ml. of 20% saline was injected. To each 200 ml. of 20% saline was added 2 mega units of crystalline penicillin and 1 gram streptomycin. Care was taken to see that the needle was not inadvertently withdrawn or pushed deeper, to avoid injecting saline outside the amniotic cavity. During injection the fully conscious patient was asked whether she experienced any giddiness, headache, feeling of warmth, pain in the lower abdomen, or any other symptoms.

If the transabdominal amniocentesis failed, the patient was placed in the lithotomy position and the vagina cleaned with soap and water. The cervix was visualized with the aid of an Auvard's speculum and a polythene tubing passed into the uterine cavity to a depth of about 10 cm. After ascertaining that there was no bleeding at the site of the tip of the tubing, between 100 to 200 ml. of 20% saline was injected slowly. The patient was asked to report any symptoms associated with the injection, during the procedure. Should any symptom appear, the procedure was abandoned immediately. The patient often complained of slight lower abdominal pain or ache during injection but other symptoms should not occur.

After injection the patient was sent to the ward and put on intake output chart and hourly pulse and blood pressure chart for 6 hours. The next morning oxytocin was administered by titration method. The concentration was increased from 10 units per pint of 5% Dextrose to 20 units, 40 units and 80 units. The rate was increased at the rate of 10 drops per half hour from 20 drops per minute to a maximum of 50 drops per minute. The drip was maintained at a rate which produced good uterine contractions, or at a maximum concentration of 80 units per pint of 5% Dextrose at the rate of 50 drops per minute until the patient aborted. A vaginal examination was usually carried out the same evening if the patient had not expelled the foetus, to see if the foetus was lying in the vagina. Our experience showed that with earlier gestations the foetus may be lying in the vagina for quite sometime without it being expelled. By the end of 24 hours of oxytocin infusion the situation was reviewed and a decision made whether to continue oxytocin infusion or to terminate pregnancy by an alternative method.

RESULT

Route of Injection

In all, 24 cases were terminated by injection of hypertonic saline. Transabdominal intraamniotic injection of 20% saline was attempted on 23 cases. In 6 cases amniocentesis failed. Of these 6 cases, saline was injected into the space between the amniotic membranes and the decidua basalis (extraamniotic space) through the cervical canal in 5 cases, and one into the amniotic cavity through the anterior fornix. In the remaining case, saline was injected into the extraamniotic space through the cervical canal primarily.

Amount of Liquor Withdrawn and Amount of 20% Saline Injected

The amount of liquor withdrawn ranged from 5 ml. to 250 ml. and the amount of 20% saline injected ranged from 70 ml. to 200 ml.

Duration of Oxytocin Infusion

This ranged from 3 to 33 hours. Four cases did not receive any oxytocin as they aborted before they were due for oxytocin infusion.

Interval Between Injection of 20% Saline and Abortion

In our series of 24 cases, all aborted. The shortest interval was 10 hours and the longest 49 hours (See Fig. 1).

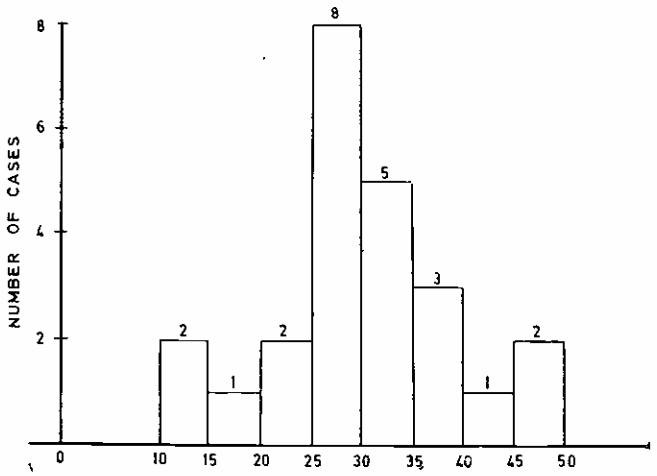

Fig.1 - Interval between injection of 20% saline & abortion in hours

Evacuation of Uterus After Abortion

It was our policy to perform curettage on all patients after they had aborted. However, evacuation was not performed on three cases through mistake. At curettage, abortion was found to be complete in 5 cases. In the remaining 16 cases varying quantities of placental tissue was obtained.

Complications of Intrauterine Saline Injection

No complication occurred with 19 cases who had intraamniotic injection of 20% saline. Of the 5 cases who had extraamniotic injection of saline, one developed giddiness, feeling of warmth and paraesthesia of the hands (symptoms of hypernatraemia) after 70 ml. of 20% was injected. Injection was stopped immediately. The symptoms passed away shortly afterwards and she aborted 26 hours after injection. This was the only patient who bled more than usual and was given 300 ml. of blood. Evacuation of the uterus was done and patient discharged the same day. When seen 5 weeks after operation, the patient was well and her menstruation had returned normally.

Post-operative Follow-up

Every patient was seen four weeks after operation. In addition 20 cases were seen between 1½ months and 7½ months after operation (See Table IV).

TABLE IV

Last Seen (Weeks After Operation)	No. of Cases
6 - 10 weeks	5
11 - 14 weeks	4
15 - 32 weeks	11
4 weeks	4
TOTAL	24

Menstrual Pattern

In 13 cases normal menstruation returned 4 to 5 weeks and in 7 cases, 6 to 8 weeks after termination. There were two cases of dysfunctional uterine bleeding. One of which returned to normal one month later. The menstrual pattern was not known in 4 cases as they did not come back for subsequent follow-up.

DISCUSSION

Our experience with 24 cases is encouraging and favourable. Every case aborted within 49 hours after injection and 79% of cases aborted within 36 hours. No complications were encountered with intraamniotic injections. With extraamniotic injections, one case had symptoms of hypernatraemia from probably intravenous infusion of hypertonic saline. However, this patient aborted successfully after 26 hours, inspite of a small dose of 20% saline (70 ml.) given to her. This patient recovered completely. Normal menstruation returned within 6 weeks after termination in most cases.

Although Wagner *et al* (1962), concluded from their study on 25 cases, that oxytocin infusion did not shorten the abortion time, we feel that their oxytocin infusion was insufficient in concentration and duration. In our series, oxytocin was administered routinely after injection of saline. The effect of oxytocin will be analysed on a larger series.

Comparing the complications associated with intrauterine saline termination and hysterotomy (Table V), it will be appreciated that hysterotomy carries a higher complication rate. The incidence of post-operative morbidity and wound infection is high with hysterotomy, while no such complications occurred with intrauterine saline injection. In institutions like Kandang Kerbau Hospital, where there is an acute shortage of beds, duration of hospital stay is very important. The problem is so acute that patients following a major operation like hysterotomy, are discharged on the third post-operative day if uncomplicated.

TABLE V

COMPLICATIONS: HYSTEROTOMY COMPARED WITH INTRAUTERINE SALINE TERMINATION

Complications	Hysterotomy	Intrauterine Saline
1. Post-op morbidity (Temp. 100°F on 2 or more occasions)	12 (34%) (8 on antibiotics)	0
2. Haemorrhage	2 (6%)	1 (4%)*
3. Wound infection	5 (14%)	0
4. Prolonged bleeding after op. (2 weeks or more)	4 (11%)	0
5. Dysfunctional uterine bleeding	2 (6%)	2 (8%)
6. Intravenous infusion of saline	0	1 (4%)*
†7. Mean duration of hospital stay	133 hours (5 days 13 hours)	77 hours (3 days 5 hours)

*Same patient.

†This period includes 1 pre-operative day.

This practice under present circumstance though unavoidable, is of course undesirable. The average duration of hospital stay for cases terminated by hysterotomy is twice as long as for cases terminated by intrauterine saline injection—5 days and 13 hours for hysterotomy and 3 days and 5 hours for intrauterine saline injection. The duration of stay can in fact be reduced by 1 day for each case, because patients undergoing intrauterine saline injections could be admitted on the day of operation, as no anaesthesia is needed. However, this is not possible with hysterotomy, which is a major operation requiring the usual pre-operative preparations. Hysterotomy takes about 40 minutes while intrauterine saline injection takes only 10 minutes. The post-operative recovery period is much longer for hysterotomies. In addition, hysterotomy carries the risk of developing endometriosis. A uterine scar for those who wish to have more children is another major disadvantage with hysterotomies and an abdominal scar in an unmarried girl is best avoided.

In our opinion, intrauterine saline injection is a good method for terminating mid-trimester pregnancies and is superior to hysterotomy for those cases who do not want sterilisation.

For a long time there has been much bias against intrauterine saline terminations for two main reasons. One reason is that this method is not always successful in inducing abortion and the other is the fear of the risks of fatal infection and fatal hypernatraemia as a result of intravenous infusion or absorption. In a Swedish survey, 2,797 cases of intraamniotic injections of 20% saline and 3,364 extraamniotic injections were reviewed by Bengtsson in 1967. The success rate after one injection with intraamniotic injections was 96·5% and 85·5% with extraamniotic injections. There were three deaths, 2 following intraamniotic injections, and one following extraamniotic injections. Of the 3 deaths only one could be attributed to hypernatraemia. In this case 400 ml. of 20% saline (double the recommended dose) was given. One case of serious haemolysis was also reported. Undoubtedly many gynaecologists were put off by the report of 2 deaths by Cameron and Dayan in 1966 from hypernatraemia. Again the safety precautions were not followed. Excessively large quantities of sodium chloride were given and one patient was under general anaesthesia. The Swedish survey in 1967 had undoubtedly shown that this method is effective (96·5% success rate) and safe when this procedure is carried out with adequate precautions. In a survey on the views of Swedish consultant gynaecologists on intrauterine saline injections as a method of inducing abortion, 80% considered intraamniotic injections good and 68% considered extraamniotic injections good. It is important to observe strict asepsis during the procedure. Although Bengtsson (1967) feels it is unnecessary to add antibiotics into the saline injected, in our series 2 mega units of crystalline penicillin and one gram of streptomycin were added to 200 ml. of 20% saline as a precaution against intrauterine infection. With transabdominal injections care must be taken to see that saline is injected into the amniotic cavity and not outside. To be certain that the needle is inside the amniotic cavity clear amniotic fluid must be obtained

immediately before saline is injected. The needle should be held with the fingers against the skin at the site of entry so that it does not move out of position. Bengtsson overcomes this difficulty by passing a polythene catheter into the amniotic cavity after amniocentesis. The patient should be fully conscious and asked to report any symptoms of hypernatraemia during and after injection. Should any symptom appear the procedure should be abandoned immediately. Not more than 200 ml. of 20% saline (containing 40 grams of sodium chloride) should be injected, as it has been shown that the kidneys can excrete 45 grams of sodium chloride per 24 hours (King *et al*, 1964). As the risk of hypernatraemia is greater with extraamniotic injections, a smaller volume of 20% saline should be injected slowly.

Contraindications for intrauterine saline injections include heart disease, liver disease, renal disease and hypertension. These conditions reduce the capacity of excess salt excretion.

Other technical complications associated with transabdominal injections include damage to bowel (cases with previous operation), injecting into the bladder, peritoneal cavity or into the myometrium. When 20% saline is injected into the peritoneal cavity or bladder, the patient will immediately feel a sudden intense pain in the lower abdomen. Emptying the bladder before injection should prevent accidental injection into the bladder.

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