

SPARTEINE SULPHATE AS AN OXYTOMIC

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In 1958 Gray and Plentl reviewed the literature on sparteine, a natural alkaloid with remarkable oxytomic properties, the use of which had been advocated for induction of labour and the treatment of uterine inertia by several European and South American workers. The chemistry, toxicology, pharmacology and the reported clinical studies were also reviewed by the same authors who advocated further clinical trials under rigorously controlled conditions. Plentl, Friedman and Gray (1961) presented a statistical study on the use of sparteine sulphate in 1364 intrapartum and 200 postpartum patients. Since the drug appears to possess many advantages over oxytocin in the ease of administration and safety, a small quantity of the drug was obtained through the courtesy of Unichem Laboratories of Bombay for trial in selected cases of labour at the Medical College Hospital, Nagpur.

Methods and Material

The drug was supplied in strength of 150 mgms. per ml. in rubbercapped vials containing 10 ml. of the solution.

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The subjects were patients selected from the routine admissions so as to provide a variety of different complications where an oxytomic could be used with advantage and in many of whom intravenous oxytocin would have been otherwise used. The drug was used in 42 cases classified into the following types.

- (a) Induction of labour 15 cases
- (b) Acceleration of normal labour 5 cases.
- (c) Premature rupture of membranes before the onset of labour 9 cases.
- (d) Uterine inertia of the hypotonic type 10 cases.
- (e) Labour in twin pregnancies 3 cases.

A test dose of 75 mgms. was given in the first few cases but as no untoward reactions were noted, 150 mgms. intramuscularly every hour for four doses or more were given for the majority of cases. If no contractions were observed after four doses the drug was discontinued and pitocin drip substituted whenever suitable. When uterine contractions were well established and moderately strong the drug was usually discontinued. The condition of the cervix, the state

of uterine activity and the foetal heart tones were observed before the drug was given. The effects of the drug on uterine action, the injection-delivery interval and the complications of labour were carefully recorded. Drugs like pethidine, chlorpromazine, serpasil, penicillin, etc. were used whenever indicated according to the usual practice in the hospital.

Results

(a) *Induction of Labour.* Labour was successfully induced in seven out of fifteen cases; the indication for induction was pre-eclampsia in eight, antepartum haemorrhage in four, diabetes in one, hydrocephalus in one and elective induction in one. In the successful cases 3-7 doses of sparteine were used. The status of the cervix was considered favourable in all the seven successful cases. There were 8 failures in the induction group. The cervix was favourable in six of these. In four of these cases pitocin drip also failed. Except for two cases in the failure group all other cases were between thirty-six weeks to term.

(b) *Acceleration of Normal Labour.* In five patients at term, 1-3 doses of sparteine were given, after labour was established and cervix was 2-3 cms. dilated. All patients were multiparous and the injection-delivery interval varied from two to six hours. The results were considered extremely satisfactory and no untoward reactions were observed either in the mother or baby in any case. In two of these cases pitocin induction had been used and sparteine was given after the labour was well

established after discontinuing the pitocin drip.

(c) *Premature Rupture of Membranes.* In nine cases sparteine was tried where membranes had ruptured before the onset of labour. Sparteine was started 24 hours after rupture had taken place in three cases, 12-24 hours later in 4 cases and 4-7 hours later in two cases. Two to four doses were sufficient to bring about good uterine contractions and well established labour in cases where membranes had ruptured for over twelve hours (in seven cases). In the two cases where membranes had ruptured 4-7 hours prior to injections of sparteine, six and eight doses were required to establish labour. The duration of pregnancy was 34 weeks in four cases, and 36 weeks to term in five cases and did not appear to influence the number of injections. All patients were successfully and safely delivered.

(d) *Uterine Inertia of Hypotonic Type.* Ten cases of uterine inertia were selected, in whom the uterine contractions were very weak and infrequent and where there was delay in dilatation of the cervix, after the 3 cm. stage had been reached. Of these, seven were normal pregnancies, one was a twin pregnancy with leaking and feeble pains for 12 hours, one was a case of hydramnios where membranes had been ruptured artificially and one was a case of severe anaemia complicating pregnancy in labour for 12 hours. One to four doses were used in these cases to establish strong contractions and the results were noted to be excellent in all the cases.

(e) *Labour in Twin Pregnancy.* In three cases of twin pregnancy with severe toxæmia, sparteine was given after rupture of membranes. A combination of largactil, phenergan and pethidine was used for sedation and control of blood pressure as is the usual practice in this hospital. Patients were given 4, 2 and 3 doses of sparteine respectively and in all these cases labour progressed satisfactorily and it was noticed that even though sparteine had been stopped after contractions were well established, the delivery of the second twin followed within 5-10 minutes after the delivery of the first baby. It is difficult to prove that this was due to sparteine as the number of cases is too small but this is well worth studying.

Comment

In this small trial, the results were extremely gratifying except in the group where sparteine was used for induction. Even in this group 50% of cases were induced successfully without the use of any other drug, and considering the ease of administration of sparteine the results were satisfactory. In small hospitals in this country, the pitocin drip cannot prove popular because of shortage of staff and lack of specialist services. Unless they have already had some experience and training and seen the pitocin drip used, the obstetricians usually are nervous of using pitocin drip and even in these days some of them use the fractional intramuscular method. It is a matter of great regret but it has to be admitted that a large number of maternity homes and smaller hospitals do

not have properly functioning autoclaves and rigors following intravenous fluids are not uncommon. On the other hand, in larger hospitals and teaching institutions the pitocin drip is used more often than perhaps strictly indicated. Under these circumstances an oxytomic which is economical and can be used by the intramuscular route with absolute safety to the mother and baby should be very welcome. One is rather surprised to note that this drug is not more widely used.

Gray and Plentl (1958) pointed out that about 35 mgms. of sparteine sulphate has the oxytomic action equivalent to one international unit of oxytocin. The effect of sparteine is potentiated by sympatholytic agents or in combination with drugs like cardiazol, metrazol, etc., Plentl, Friedman and Gray (1961) evaluated retrospectively the clinical application of sparteine sulphate in 1364 intrapartum and 200 postpartum patients. They pointed out that the drug has certain important advantages over other oxytomic agents such as the route of administration which is intramuscular, the effect on the duration of labour which is shortened in all stages, no known side-effects and wide margin of safety. The same authors studied the effects on the cervical dilatation time curve and reported a statistically significant shortening of labour after sparteine. According to these authors when used as a prophylactic postpartum oxytomic, the uterotonic action is brief and the drug offers no advantages over oxytocin. In the same authors' words "for the induction or stimula-

tion of labour, on the other hand, the drug is unique. Its demonstrated lack of side effects, relative safety, and ease of administration justified and brought about its extensive use in this institution".

Our experience in a small number of cases entirely substantiates these observations. Plentl and Friedman (1963) reported on 407 cases where sparteine was used only for induction where other criteria for induction were satisfactory. Labour was induced successfully in 83.3% and it was observed by them that at least half the failures were due to poor selection or inadequate trial. Boysen (1963) reported a case of incomplete rupture of the lower uterine segment in an eighth gravida where one dose of 150 mgms. of sparteine was given in the latent phase of labour. He pointed out that sparteine sulphate should be administered with caution and the same dangers inherent in the use of any oxytocin in labour pertain to sparteine also. Bedrosian and Gamble (1963), in reporting a case of uterine tetany and foetal distress coincidental with administration of sparteine sulphate, also stress the need for close observation by trained personnel and the reporting of similar experiences, however rare, so that any casual relationship can be properly evaluated. Sandberg et. al. (1959) studied the oxytocic properties of L and D sparteine in vitro and concluded that L and D sparteine have oxytocic action as a whole, the degree of which varies in different parts of uterus and during the sexual phases, being most pronounced on the lower segment of pregnant uterus.

In conclusion, we may state that sparteine is a drug which, as an oxytocic, is preferable to pitocin in induction and acceleration of labour because of the ease of administration, minimum of side-effects and wide margin of safety. The precautions in the selection of cases, however, should be the same and the patient, particularly the grande multipara, should be under close observation when the drug is being administered. The drug is likely to be particularly useful in induction where membranes have been ruptured prematurely and in acceleration of labour in complications like hypotonic inertia where it should be the first choice. Where sparteine has failed, pitocin can be tried and when contractions are well established sparteine can be substituted so as to avoid the inconvenience of a prolonged intravenous drip to the patient.

Summary

Sparteine sulphate was tried because of its pronounced oxytocic properties in: (1) 15 cases of induction, (2) 5 cases of acceleration of normal labour, (3) 9 cases with premature rupture of membranes, (4) 10 cases of uterine inertia, and (5) 3 cases of twin pregnancy. The results are reported. No adverse effects on mothers or babies were noted.

A brief review of available literature on sparteine is given. Sparteine sulphate should be the oxytocin of choice for induction and acceleration of labour provided the usual criteria are used in the selection of cases and patients carefully observed during labour.

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