QUININE — ITS USE IN LABOUR

by

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The use of quinine for induction of labour and for stimulation of uterine contractions in labour, was in vogue from about 1875 to about 1930. (Dilling, 1929, Dodds 1931, Theobald 1959). It, however, fell into disrepute over years, for several reasons. Intra-uterine foetal death due to toxicity of quinine resulting from transplacental transmission, tetanic contractions of the uterus producing placental insufficiency, toxic manifestations like tinnitus, headache, giddiness and vomiting in the women, are among the main disadvantages of quinine, listed in literature. (Mudaliar 1938, Gibberd 1947, Allan 1948, Munro Kerr 1949).

The use of quinine is deprecated today both in text-books and by teachers. Its dangers are repeatedly emphasised, and the young obstetrician is scared to use it. One of us, (A.M.) who belongs to the modern student world also felt restrained to administer quinine at our institution in the beginning. The experience of the senior author with this method extends over more than 3 decades. The purpose of this presentation is to place the combined experience of the authors in the use of quinine in labour.

Material and Method

All cases which received quinine alone or in conjunction with other procedures or drugs, during the period March 1954 to April 1965, have been included here, a total of 274 cases. The total number of deliveries conducted over this period was 2822. Quinine was thus administered to 9.79 per cent of the patients.

Quinine was given only to cases with vertex presentation.

It was generally the practice to resort to what was called 'full induction'. This consisted in giving castor oil 1 oz., followed by a warm water enema an hour later. Quinine sulphate gr. V in the form of capsules followed next, at intervals of 1, 2 and 4 hours after the enema. Injection pituitrin or pitocin, or artificial rupture of membranes were the measures occasionally employed, in addition. Sometimes the quinine capsules were administered without the castor oil or the simple enema.

The full induction was utilised on 256 instances. These included a few in which quinine was used alone.

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Help of injection pituitrin, pitocin or artificial rupture of membranes was taken in 18 cases.

Indications for quinine in labour were four; namely,

1. For induction of labour (75 cases).
2. To initiate uterine contractions after premature rupture of membranes had taken place (37 cases).
3. To stimulate uterine contractions in cases in which there had been indifferent and irregular pains, just prior to onset of labour (119 cases).
4. To hasten the process of labour in uterine inertia (43 cases).

Quinine was not resorted to, in labour, with a cervical dilatation of more than 3 cms.

The criteria for labelling success to the induction were

(a) Definite clinical evidence of onset of labour in group I, and of improvement in uterine contractions with rapid progress of labour in groups II, III, and IV.

(b) The termination of labour within 48 hours in group I and within 24 hours in the other groups, since the establishment of the induction.

There were then, a total of 203 successes, 41 in group I, 34 in group II, 91 in group III, and 37 in group IV. The total success was 74.45 per cent.

There were 252 spontaneous labours, 12 ended in caesarean section and 10 in forceps. Out of these 22, in 15 cases quinine had failed to act and 17 cases were primiparous.

Details of the scores of the successful cases in the different groups

Group I: Induction of labour.

If the patient delivered within 48 hours of the onset of induction the response was considered satisfactory. If delivery occurred in 24 hours it was scored as good and if it occurred between 24 and 48 hours the response was scored as moderate. The induction was taken as failed if delivery did not occur in 48 hours.

Accordingly, there was good response in 33 cases, moderate response in 8, and no response in 34. The success achieved in this group was only 54.66%.

Analysis of failures

Among the 34 failures (a) 11 had spontaneous deliveries, of which 5 occurred one or more weeks after the attempt at induction; others delivered earlier. (b) In 11 cases a repeat induction was attempted, 4 of whom had it 1 week or later after the first attempt. In all but one case, the second attempt was successful. (c) Intravenous pitocin drip was subsequently given to 10 patients, in 4 of whom the method failed. (d) One delivered spontaneously after an artificial rupture of membranes and one had caecarean section for uterine inertia later on.

Group II. Initiation of uterine contractions after premature rupture of membranes. (Table I).

When a patient was at full-term or near it, and had premature rupture of membranes without uterine contractions for over 8 hours, we resorted to quinine administration frequently.

The interval between the rupture

TABLE I

Interval Between Rupture of Membranes and Induction

Induction/delivery Interval	8 hrs.	12 hrs.	16 hrs.	20 hrs.	24 hrs.	TOTAL
Excellent 8 hours	7	4	2	Nil	5	18 cases
Good 16 hours	1	2	4	Nil	7	14 cases
Moderate 24 hours	Nil	Nil	Nil	Nil	2	2 cases
Failure	1	Nil	Nil	Nil	2	3 cases

of membranes and the institution of induction regime was correlated with the time between the induction (i.e. when castor oil was given) and the delivery. The response was considered as excellent, when the induction delivery time was 8 hours or less, as good when it was between 8.1 and 16 hours, and as moderate when it was between 16.1 and 24 hours.

In this group of 37 cases, 18 responded excellently, 14 responded well and 2 responded moderately. The overall success was 91.89%.

Group III: Stimulation of proper uterine contractions in cases with indifferent and irregular pains, just prior to the onset of labour. (Table II)

This was the commonest indication in the series. Prolonged periods of anxiety before labour caused tension and annoyance both to the patient and her obstetrician. This was avoided by inducing with quinine.

There were 119 patients in this group. The interval between the onset of indifferent pains and the starting of induction was correlated with

TABLE II

Interval Between Indifferent Pains and Induction

Induction/delivery Interval	8 hrs.	12 hrs.	16 hrs.	20 hrs.	24 hrs.	Over 24 hrs.	Total
Excellent 8 hours or less	8	13	7	3	7	6	44 cases
Good 16 hours or less	4	4	1	4	16	8	37 cases
Moderate 24 hours or less	Nil	1	Nil	Nil	6	3	10 cases
Failure	12	4	1	2	4	5	28 cases

the interval between the induction and the delivery, in all the cases in which success was noted. The scoring in these cases was done in the manner indicated in the previous group.

Thus there were 44 cases in whom the response was excellent, 37 in whom it was good and 10 in whom it was moderate.

worked in 68 cases, i.e. 70.84%.

(b) Parity II to IV ... 122 cases: Quinine worked in 91 cases, i.e. 74.59%.

(c) Parity V & over ... 56 cases: Quinine worked in 44 cases i.e. 78.57%.

The figures seem to indicate that primiparae succeeded less frequently than multiparae.

TABLE III

Influence of:		Total	Success	Failure	Success %
Maturity	36-39 weeks	18	4	18	22.22
	Full Term	220	171	49	77.72
	41-43 weeks	36	27	9	75.00
Station	Floating	102	68	34	67.75
	Engaged	172	135	37	78.49
Condition of Cervix	Ripe	92	72	20	78.49
	unripe	23	7	16	30.43

There were 91 successful cases and 28 failures in this group giving a successful percentage of 76.45.

Group IV: Hastening of labour with quinine.

Quinine was used for the above indication selectively. There were 43 cases, 37 in whom the result was successful and 6 resulted in failures. This gave a successful percentage of 81.05.

Factors influencing the induction

Four factors were considered. These were (1) parity of the patient (2) term of pregnancy (3) station of the presenting part and (4) the condition of the cervix at the time of induction.

Parity

(a) Parity I ..... 96 cases: Quinine

Term of Pregnancy

There were 18 cases of less than 40 weeks of maturity. Four responded to the induction; 1 was in early labour, 1 had mild toxaemia, 1 had leaking membranes and 1 had mild ante-partum haemorrhage. Fourteen patients did not respond; 12 of these were mistaken for full-term pregnancies, when they were actually at about 38 weeks. Prematurity had thus disfavoured the induction of labour as practised above. It may not be too presumptuous to say that quinine induction is a test for the confirmation of maturity, if no other abnormality is present in a given patient.

The number of ful-term pregnancies induced was 220; 171 of these responded satisfactorily. There were 36 cases of post-maturity, varying

from one to 5 weeks. Except for 9 cases, all responded to the induction.

From this, it may be concluded that quinine may not be used in normal patients for premature induction. Its use in full-term and post-mature patients is, however, warranted.

Station of the presenting part (See Table III)

Only two stations were considered. Those in whom the head was floating, and those in whom the head was engaged; in the former group there were 102 cases with a success rate of 67.75%; in the latter, there were 172 cases, a success rate of 78.49%.

Engagement of presenting part favoured induction, due probably to better formation of the lower segment of uterus and also due to the pressure of the engaged part on the cervix.

Condition of the cervix at the time of administration of quinine (See Table III)

Forty-three patients who were in labour, (group IV) were not considered quite naturally. In the remaining, a vaginal examination was done on only 115 instances. In 92, the cervix was ripe; induction succeeded in 72 of these i.e. in 78.49%. In 23 instances, the cervix was unripe and induction was successful in only 7, i.e. 30.43%. Thus ripeness of cervix significantly improved the results of induction.

So far the total number of cases was taken into consideration in relation to the above four factors. When the 4 different situations in which the patients presented, were compared individually with the above factors, the following deductions were made. (Histogram).

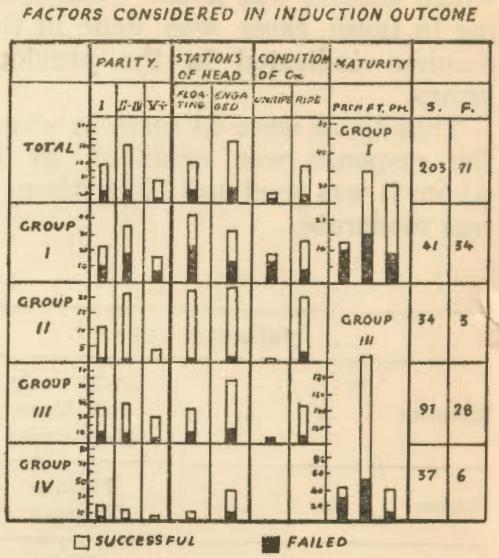

Fig. 1

1. The factor of parity was immaterial for pure induction of labour, in which on an average the success rate was 54.66%. However, when the uterus was ready to go into labour, the induction succeeded better with increasing parity.

2. It was quite clear that, whatever may be the other conditions, prematurity hampered the success of induction, while full-term and post-mature pregnancy almost invariably helped the induction, irrespective of the other prevailing conditions.

3. Engagement of foetal head was a favourable situation in all the groups, though to a lesser extent in the group of pure induction.

4. The ripeness of the cervix was undoubtedly a factor to be desired in all the groups.

Adverse effects of quinine

One patient had mild post-partum haemorrhage in the series of 274 cases. Two infants, out of the 8 which were lost, were post-mature by 15 days and 3 weeks respectively. These two still-births were due to no clear reason. They could have probably been due to quinine though associated post-maturity was present.

It was difficult to figure out, but an impression had been gathered that, in many instances, there had been meconium-stained liquor, without significant variation in foetal heart sounds or in the Apgar grading of the infant at birth.

In 3, vomiting followed the use of quinine but it was impossible to assess whether vomiting was due to the drug or due to cervical dilatation which ensued.

Comments

This study, as has been mentioned, is presented with the intention of reviewing the authors' experience. We do not claim superiority of the quoted induction regime over the others in use. In fact, in many instances, intravenous pitocin drip or artificial rupture of membranes had been employed, though the use of quinine was comparatively more frequent.

The notoriety gained by quinine has been undoubtedly the result of its reckless subjection in labour, rather than to any real bad effects. The analysis fails to bear out the point that the incidence of perinatal mortality increased or that any harm occurred to the new-born. The overall perinatal mortality rate for the same years had been 4.8%, while in the quinine series of 274 cases, the perinatal mortality rate was 2.9%. Dilling and Gemmell, in a masterly study in 1929 and Dodds in his lucid review, came to the conclusion that the use of quinine did not add to the risk to the foetus. Stirling and Hodge, in 1961, reached the same conclusion. McSwiney, Gibberd and others who emphasise the foetal risks with quinine do not have sufficient statistical data. It is very clear from the English literature of the last 50 years on this subject that whenever a detailed analysis was carried out, it failed to show increased risk to the foetus through the use of quinine in labour.

The increased number of meconium-stained liquors subsequent to quinine is an old observation and is due probably to hypertonicity of the uterus due to the drug, as observed by Acton, in 1921. We have collaborated the observation by our tokographic recordings.

Toxicity to quinine in mothers can be reduced by lowering the dose and 15 grains as given in our series have had no adverse effect. Previous authors have generally used higher doses. Eastman (1938), mentioned Schubel's experimental study which indicated that small doses of quinine stimulated uterine musculature while larger doses depressed it. Therefore, larger doses are of no benefit.

Premature induction of labour has not been satisfactorily achieved with quinine; in fact Theobald (1963) said that no medical method will succeed. However, when prematurity is coupled with toxaemia or antepartum haemorrhage, quinine has been encouraging. Dodds too had successfully induced labour in similar situa-

tions with quinine. Watson felt that success rate could be increased from 50 to about 90% if pituitrin is included in the regime.

We have reached conclusions regarding the other factors, similar to those of Dodds, namely that parity plays little part in true inductions, maturity is an important factor and repetition of quinine induction may be tried with safety. Ripeness of cervix as shown by Stirling, and prior rupture of membranes facilitate success of quinine regime.

It is our candid opinion that, used judiciously and in correct doses, quinine is of definite value in labour. The method is simple and safe. Every procedure or drug in medicine is dangerous and harmful, when used indiscreminately. Quinine is no exception.

Conclusions

The above study warrants the following conclusions.

(1) On the whole the experience with quinine induction coupled with castor oil and simple enema, had been encouraging and justified a continued patronage.

(2) The method, when used for pure induction of labour, did not have satisfactory results (54.66%), unless there was a high selection value assigned to the cases.

(3) When labour was almost imminent, as in group II and III, the regime afforded its best utility, reaching a success rate approaching 80%.

(4) In early labour quinine capsule acted effictively as oxytocic in nearly 81% of the cases.

(5) As in any type of induction, the parity, maturity, station of presenting part and the ripeness of cervix played vital roles, and

(6) The regime had no adverse effect on the mother or her foetus.

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