Thesis for Graduation

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The action of Traunme considered in connection with its effects on the Parturient Uterus
The action of Puminus in connection with its effect on the Parturient
Uterus.

It is well known that Puminus has the power of exciting
contractions in the gravid uterus. It is mentioned in the ordinary text-
books not only as a direct stimulant but also as an abortific. It is seldom
used in this country as an abortific though it is occasionally used as such
in America.

In 1846 I began to make observations of the action of Puminus with the
object of ascertaining whether or not reliance can be placed upon it as
an abortific. The observations have been principally during the second stage of parturition.

In looking for a remedy to allay or remove a pathological condition it
is necessary to understand the normal structure and function of the affected
part and to ascertain the cause of
of the abnormal conditions. Therefore, before giving the results of these observations it will be as well to consider 1. The nature of uterine contractions (2) The state of the circulation in labour (3) The causes of the prolongation of the second stage of parturition.

I. The nature of uterine contractions.

The muscular fibres of the uterus are composed, and the uterus is mainly composed of this tissue which is under the control of the nervous system. The nerves are principally derived from the sympathetic system, partly from the cerebrospinal through the sacral nerves.

Involuntary muscle has a greater tendency than voluntary to rhythmic contraction. It has been shown that the conditions for rhythm are contained in contracts tissue itself. Probably, however, a stimulus which may be slight is required to induce the rhythm in involuntary muscle. Mechanical distension is a powerful stimulus in exciting contractions, a circumstance to be borne in mind in connection with parturition. The veins of a
fats, by were observed by Leucking in rabbit after the death of the animal when artificial circulation was maintained. Engelmann observed that in the uterus in which no nerves have been found rhythmical contraction occurred when the uterus was exposed showing that it may contract without extra stimulus and when the animal was stimulated and the excitability of the uterus was thus diminished that excitement increased its rhythm.

The contractions of the parturient uterus are rhythmically characteristic. They begin slowly, then a tolerably rapid accession of strength until a maximum is reached, there is a continuance of the maximum and this is followed by a gradual decadence until the "pain crisis." There is a varying interval between one contraction and the next i.e. there is a state of rest or repose. This interval is of immense importance. Unless it occurred, on the one hand, the mother's power would be exhausted, and on the other, the placental circulation would be interfered with so as to cause the death of the child.

1. Fagusio's Note. 2. 38. 26. 8 4686. Instructed by Louis Rompe.
2. 38. 11. 3 217. Pharmacology, Therapeutics.
There is an analogy between the
parturient uterus and a slowly beating
heart. They are both independent of
volition; their contractions are rhythmic,
and may be inhibited or excited. During
labour inhibition may occur - the entrance
of a stranger into the lying-in-room
may cause an entire cessation of pains.
On the other hand, sudden emotion may
excite labour. Prof. Dr. Feltz remarks
that the rhythmic character
of the contractions suggests that the
cause is external, as it is in the heart,
in the organ itself. This view is
supported by the fact that after destruction
of the spinal cord in the uterus, the
stimulated contractions occur similar
to those of parturition. On the other
hand, experimental investigations show
that the contractions mainly depend
on the spinal cord and these
experiments are supported by moral
evidence. Robat has shown that
there is a uterine centro in the
limbata region. This may be directly and
also reflexly stimulated - Dr. Bach
Hofmann in their experiments found
in the dolfi two paths along which
different impulses pass from the center.
nervous system on a sympathetic tract
the other a spinal. They assert that
the former contains vasomotor; the
latter vasodilator nerves. Rohon found
two distinct paths in the rabbit. He
also found that reflex movements are
more easily induced by central stim-
ulation of the Spinal and Cordal nerves
than of the brachial or other nerves of the
anterior part of the body, and that
very energetic movements take place
when the central ends of the Sympath.
nerve are stimulated. This is an
important observation in connection with
Banting's. According to Rome, there
is another centre and that is located
in the Brain. Stimulation of the
Cerebrum, Area Cerebri, Corpora Striata
and Cerebellum excite uterine
contractions. Whatever may be the
cause of the origin of labour, whether
it be automatic or reflex, clinical
evidence supports the view that the
continuance of the contractions is
largely dependent on reflex action. In
normal labour so soon as the membranes
are ruptured and the posterior part
of the child comes in contact with
the Bantingian passage labour begins.
more rapidly. As more and more of the fetus comes in contact with the vaginal walls the stronger and more frequent the pains become. It is then too that the abdominal muscles come into play. The reflex action is further evidenced by the fact that introduction of the finger through the C and sweeping it round or stretching the C, or stretching the perineum especially the presenting part is how with cause an increase in the force and frequency of the contractions.

The state of the circulations in Pregnancy and Parturition.

Not only is there an increased quantity of blood directed to the uterus in pregnancy and parturition but the blood pressure of the mural circulation is increased. Ballantyne states that there is a further increase of tension in parturition reaching a maximum during a uterine contraction. He gives no explanation of this fact, undoubtedly the increase in pressure is due to the large quantity of blood suddenly driven from the uterus into the general circulation.
Prolonged labour depending on defective action of the expulsive powers.

Injuries or prolonged labour may be due to many causes. Some are due to mechanical obstruction e.g. rigidity of the passages, others depend on deficient or irregular action of the expulsive powers. The expulsive powers are the uterus and the abdominal muscles. From the foregoing considerations it is evident that prolongation due to defective action of the uterus may depend on a variety of causes. (1) There may be an imperfect development of muscular tissue. (2) There may be exhaustion of muscular tissue. (3) The nerve supply may be in fault. (4) The circulation through the uterine vessels may be imperfect.

In connection with the second cause it has been shown that fatigue renders the contractile wave of muscle slower, stiffer, and smaller. Exhaustration of an animal has the same effect. When a muscle contracts, a chemical change of the nature of oxidation takes place in the muscle, and certain waste products occur e.g. carbonic acid and lactic acid. Fatigue is probably due to the accumulation in the muscle.
of waste products... Free circulation of blood through the muscle tends to remove these. Krause has shown that reducing substances such as a %
monoxide of iron added to a salt solution (NaCl) and circulated through the vessels of a muscle quickly restore it. These two last points
are of the same in mind in connection with Guaiac.

Treatment of Prolonged Labour

There are three modes of treatment of cases of Prolonged Labour, depending upon failure of the oxytocic powers. These are (1) The administration
of oxytocic remedies (2) Pressure of the Uterus through the abdominal walls (3) Instrumented interference. Of these
I shall consider Oxytocic Remedies.

Oxytocic Remedies—Several are mentioned in the books but the only one upon which reliance has been placed is Epsot. I shall therefore con-
sider its action rather than that of Guaiac.

(1) Epsot—

According to Lander Brenton the active principles of Epsot are still imperfectly

Krause—Ludwigo Arbeiter, 1874, p. 183
Known. Robert's researches are the most recent and he states that it contains three active principles viz, Systonic Acid, Splachinic Acid and an Alkaloid Cosmotin. He found that Systonic Acid has no effect on the uterus, and that it lowers the blood pressure. Splachinic Acid produces tetanus of the uterus and an increase of blood pressure. Cosmotin produces chronic movements of the uterus and causes contractions of the blood vessels. (See TK - remarks that was underlined and omitted)

Cosmotin causes contraction of smooth muscle throughout the body. Probably its action is on the uterine muscle. Robert, however, states that after destruction of the lumbar centre Cosmotin has no effect on the uterus. If that be so then its action must be on the spinal centre.

3. The action of Quinine

The action of Quinine on the Parturial Uterus is unlike that of Cosmotin. Quinine strengthens and prolongs the contractions, and it increases the frequency. It maintains the rhythmic character of the contractions. I have used the Sulfate in 151 cases during prolongation of the second stage.

Kohut. Practitioner 33. p 407
These active principles are not in general use and either Bougon's Myotic or Extract of Papo is used. The action of these is to produce tonic contraction of the uterus with occasional increase of violence but they do not measure the strength of the contraction. There is no complete relaxation of the uterine muscle as in ordinary labour. This condition of persistent contraction in prolonged labour results in irritation of the system and is the chief cause of the dangerous symptoms in this condition. Thus unless speedy delivery occurs there is great danger to mother and child. Sepsis might never be found unless the maternal part rest on the perineum and there is no mechanical obstacle to immediate delivery or unless one is prepared to effect delivery by forceps so soon as its active commence.

Thompson. The Science Practice of Midwifery
Vol. II. p. 9

It is generally stated that small doses increase the strength of the circulation but that large doses diminish the blood tension chiefly by weakening the heart, partly by paralyzing the vasomotor centre and thus causing dilatation of the arteries. Wild's experiments led him to conclude that it acts on the vessels themselves.

2. Wild. British Medicinal 1884 26 3 p. 534
in from 2 to 5 grain doses, generally repeated twice, in half hour intervals. The effect was usually evident in from twenty to thirty minutes. In no case was it followed by a continuous or titanic contraction, the rhythmical character was always maintained. In some cases however no action followed the administration. In considering the mode of action of Jimino it will be necessary to examine its effect on the vascular system, on the muscular fibres of the uterus, and on the nervous system.

The action of Jimino on the Vascular System

Jimino diminishes the processes of oxidation in the blood, lessening the amount of oxygen absorbed and of carbonic acids given out.

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1. Harley - Phil Trans. 1855, p. 678.
and not on the Vasomotor Centre of the Cord. He found that in the relaxed tortoise there was first contraction of the vessels, then dilatation, and eventually contraction, the quantity of blood thus passing being about half of what passed before the administration of iunine.

I have given it to adult Briniball females in from 2 to 10 plain doses, and with my fingers and with the sphygmograph noted the effect on the pulse. And I now send several sets of sphygmographic tracings to show the effect on the pulse. I generally found with these doses that in from twenty minutes to half an hour the volume of the artery decreased, and not only this but that it was more easily compressible. In some cases in from 5 to 15 minutes there was an increase in the volume of the pulse. If the tracings are compared it will be seen that whether the initial effect may be there is eventually a diminished lumen of the vessel. Frequently there is dilatation with an increased range of movement of the pulse and with a well marked diastolic-diastolic wave, and a fall in pressure. The reactions were the arteries...
observed in all cases. Professor Rutherford suggests that blood vessels in muscle have an independent or automatic tone, that there are "vaso-inhibitory fibres in nerves and that when a muscle is stimulated the fibres inhibit the energy of the muscular wall of the arteries and dilatation occurs.

During contraction an abundant supply of blood is required by the uterus. During the phase of physiological activity it develops an enormous amount of mechanical energy derived from chemical energy which is produced by changes in the constituents of the muscle. Oxygen is used up to Carbonic acid from out and in order that this condition of things can go on uninterruptedly a free circulation of blood is necessary. What the precise action of tropino is I am unable to say, it may affect the vessels in the same way that it does those of the general circulation, or it may have a special action on them. I have found that in cases of hemoptysis discharge from the uterus as in Endometritis, during the Menstruation, during menstruation and in Uterine Cancer, if Tropine was given it was almost
Invariably followed by an increased flow. I have found it also produce hem-
orrhage occasionally during an intermittent period. Whatever may be the effect
on the uterine vessels during parturition there cases suggest that in other condition
it directs blood to the uterus. I may quote a case in point. On 6th May
1858 I was asked to a young lady
suffering from facial hemiplegia. It was
exactly midway between two of her periods.
I gave her 10 spoons of iron. To help
an hour her hemiplegia was quite relieved
but at the same time she felt a sharp
pain in the hypogastric region and in a
few minutes the found hemorrhage
leaving from the vagina.

Action of Ferrine on contracted Muscle

W. T. has found that small
does stimulate, larger doses paral-lyze, uncontracted muscle. Very large doses cause
constriction. Lander, Brunton says that
Wilt and Forbes have shown that the Constitution
of all the muscles is not the same. He says
that muscular actions do not act alike in
all the muscles of an animal, and that
the effect will vary according to the chemical
composition of the tissue at the time.
Action of Quinine on the Nervous System

Quinine is said by some observers to affect sensory and motor nerves only when applied locally. Hall however states that it has no action on motor nerve trunks but that nerve endings in muscle are paralyzed by it when locally applied. The reflex action of the spinal cord is diminished, especially in the pop-bang reaction, suggesting that this probably is due to failure of the circulation.

Quinine produces a pharmacological analgesia. It has little or no effect on the pain due to inflammation or other structural change. It is in neuralgia that we find its analgesic property exhibited. There is a theory that neuralgia of the depends upon hyperemia of the neurilemma when it passes through an opening in bone. The trigeminal has many branches which pass through narrow openings and canals, and it is a nerve frequently affected by neuralgia, especially the supra-orbital. Now this branch is the one upon which quinine is stated to have the most influence. I would suppose that some of the action is due to removing pressure, which is a cause of pain, from the nerve by
diminishing the blood in the Reniform. Relief generally follows in 20 minutes to half an hour after administration, and this corresponds with the time that it generally affects the circulation. In support of this view I have found that the cases relieved by Jeunie are also immediately relieved by Electricity and the latter contracts blood vessels.

If the action of Jeunie were on the Adreno-cortical region or on sensory nerves it would relieve or abolish from the consequences of sensory nerve covered instead of only occasionally as in escinosis. Probably its action on the Splanic, in diminishing engorgements of that region, is due to its effect on the circulation.

Notes of Cases of Labour where there was prolapse in which Jeunie was administered -

There taken pains during the pains in breaking cases before and after administration of Jeunie but owing to the movements of the patient they cannot be relied upon.

To save needless repetition I may say that in the following cases there was no
November 29. Mr. J. aged 30 - Pains commenced at 2 a.m. and continued until 9 a.m. They were about every 20 or 30 minutes. Passage more painful than usual. She was delivered of a healthy male child at 11 a.m.
very little effect on the head. Ordered 5 grains of Quinine to be given every two hours. About 1/2 hour after each dose the pains were more frequent and stronger, but the effect lasted only for an hour or a little longer. At 8:30 am had in Cavity of Pelvis and as patient was exhausted I delivered with forceps. The wall of the Uterus felt thin and after delivering the contracted organ was much smaller than usual.

III Mrs S. aged 30 - Third pregnancy. July 28th 1888. Ob dilated at 10.45 AM. Head resting on brim not engaged. Contractions frequent but not expulsive. 3 grains of Quinine. At 11:10 pains became stronger and more frequent. At 11:15 another 3 grains were given. Pains became very strong and expulsive. At 11:50 delivery of a girl weighing 8 lbs. She stated that of her previous confinement 8 days was given and that it caused her first pains. There was a continued bleeding. She never had a chance of getting her breath. She had from flask errors afterpains than in her two previous labours.

Aug. 14th 86. Sent home at 8.30 p.m. Stated that membranes ruptured last night about midnight. Sound in pelvic cavity in the right occipito- transverse position. Passages moist. Pain few and flets.

Aug. 15th. At 9 a.m. Said she had few

passages in the night only. Wanted to come for

the 5 p.m. of cssino relief. At 9.20. Same

returns at 9.45. They were most powerful

and contractions occurred every five minutes

at 10.45 child born. Very few after

trains and only slight

V. Mrs. C. aged 37. Second labour.

March 26 1897. At 1 p.m. pains severe with

 lasting about 1 minute occurring every 15 minutes.

By this about 1 p.m. Labour

commenced at 1.41.45. At 4.45 pains severe, but have no prodromic effect.

Patient very tired. At 4.50 pains for 5

 minutes of automatic relief. At 5.20 pains stronger;

have more effect on the back, none to other.

Pains increased very much in force

occurring every 4 or 5 minutes. At 6.10 she

was delivered of a fine female child.

Had very few after pains.
VI. 21st June 1888. 3rd Labour: 8th month 3rd July. 1888. Labour began at 5 a.m. at 9.30 P.M. found 6 to thin, 0 at 3 to 4 dilation. Pain frequent and strong. At 9 P.M. As fully dilated. Pains first. Membrane was ruptured and immediately pains became stronger. At 10 P.M. Pains again faintly frequent. Then 5 pm of Pains. Sept. at 10.30 other 5 P.M. within a few minutes the pains became much stronger and more frequent. At 11, 40 the child was born.

VII. 28th Oct. 5th Labour: 2nd labour. 28th Oct. 1889. Pains commenced at 10 P.M. The membranes having ruptured at 6 P.M. Oct. 29th. 6 to 7 dilated, head engaged. Pains frequent but have little power. Patient complained of feeling weak and exhausted. At 11 a.m. gave her 10 per of Quinina. At 11.20 pains began to be stronger and more frequent. At 12.30 delivered of a full healthy boy. After delivering the placenta found the uterus contracted into a small bulk.

VIII. 24th Dec. D. 34. Deceant weakly small woman. 4th Labour. Quinina had no effect in this case. 11th Sep. 1888. Labour commenced at 1 a.m.
Daming story at first 10:30 a.m. Damius's abdomen is well dilated. Damius continues very fast. At 3:30 p.m. 50 cc of 3% sulph from Damius seemed slightly stronger about 3:55. Other 50 cc at 4:30. Damius then became less strong and the patient was very exhauster. I then performed the birth forces. Child weight 10 lbs 2oz. 22 inches in length, female. Lab. no. Mother and child are both very well.

In conclusion, Daming may be considered an Ayurvedic remedy. In case of delay, presence of the uterus through the Abdominal Paracentis is very valuable. Kneading or massage when it can be applied has a very marked effect. It attracts the muscles from by removing the waste products, the action is similar to a complete circulation of blood through the uterine vessels. This valuable method does not seem to be properly recognized. In some cases neither it or Daming can be applied on account of final tenderness of the uterus. Instrumental interference may be considered a 'damei' recess, and is frequently objected to by patients and

Zabulovski - Central. J. A. Med. Wap 1883
No 148. 241 - D. Seraphin, B. Sawyer
their friends. In these cases when Brestor or Ambrocyan cannot be applied, or instrumental interference is objected to, Quinine may be tried.

I have tried this drug in 157 cases
8 failed entirely
91 the contractions were stronger and more frequent
52 the contractions were decidedly stronger and more frequent

In the cases in which it entirely failed the volume of the pulse was less and was more easily compressible, even before giving Quinine. The cases in which it gave the best results the pulse was only slightly affected. Quinine affected the pulse in all cases, in the manner stated. In some cases I have given Brestor along with Quinine and in most of these cases the contractions were stronger and more frequent, but I cannot adduce sufficient evidence on this point. The valuable discoveries of Professors Foerster and Bum-Brown of Schaff, who showed that by the modification of the chemical constitution of a drug it is possible to modify the physiological action, lead me to hope
that a modification of the chemical constitution of theino (C_{24}H_{24}N_{6}O_{3}H_{2}O) may produce a drug which like ferrine stimulates the uterus to rhythmic contraction, but unlike it possesses a stimulating effect upon the heart. The introduction of such a drug would be of immense service in a large class of cases.
Tracings taken during the second stage of labour between two pains. The tracing before & after of Quinine were from has been recorded.

Taken from left radial - 35 minutes after 10% of Quinine.

Taken from left radial 1 hour after administration of Quinine. It shows that the volume of pulse was less, also pressure lowered, i.e. less than at 35 minutes after
Left Before and After

Before

After 2 P.M.

L. B. 10 minutes after 2 P.M.

L. B. 25 minutes after 2 P.M.

L. B. 30 minutes after 2 P.M.
8 M. J. aged 35. Left Radial

Metal marker

Before

After

8 M. J. 1/3 10/03 1/3 10/03
Taken from Left Radicle
A. E. T. April 30

before 10 p.m. of Quinine

after 10 p.m. of Quinine

1 hour after 10 p.m. 2/27/94