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# Prolonged pregnancy problems in diagnosis

by

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## Introduction:

The title of the discussion is "Prolonged Pregnancy" in deference to Post-Maturity. This is necessary because Post-Maturity as a subject is beset with conflicting opinions and will remain highly controversial for many years to come. It is important to stress at this time that biologic post-maturity is not necessarily a concomitant of post-date pregnancy or prolonged pregnancy. It is also important to remember that placental dysfunction is not necessarily proportional to the gestational age and indeed there have been many instances where some women are delivered two weeks before term with babies mature in every way. Conversely —there are also women who by all evidence is correct in her dates and is delivered some two weeks beyond the exact date with babies showing evidence of prematurity apart from any deficiencies which may have resulted from placental insufficiency. There is generalised admission on the present lack of dependable clinical criteria for prolonged pregnancy and my part in this discussion is to centre attention on aspects of these clinical criteria.

## Incidence and Extent of the Problem:

One must be always wary of statistics presented by the various institutions in any obstetric problem and this applies equally true to the problem of prolonged pregnancy. Thus for example—in Aberdeen, McKiddie disclosed that 24.6 per cent of 6803 pregnancies went 7 days after their calculated dates and Rathbun in America showed that 13.2 per cent had passed their calculated dates by more than 14 days. Finn Boe retrospectively puts the extent of his problem as at 2 per cent and since this involes the strict study of babies born after delivery— I must suggest that this is perhaps a more reasonable incidence to accept. For various reasons, the exact extent of this problem has never been studied in this institution and I will venture to say that it will be to every advantage to set about both a retrospective as well as an anterospective study of this problem since we are handling about 40,000 deliveries per annum.

## The Clinical Criteria of a Prolonged Pregnancy:

The clinical criteria of a prolonged pregnancy and its problems are in fact directly related to the problems associated with estimation of maturity in a pregnancy. These include prospective and retrospective methods of study and no doubt must include laboratory methods as in established series of cases, prolonged pregnancy must inevitably be linked with placental dysfunction.

## A. Prospective Methods:

### 1. The Use of Naegele's Rule:

In the majority opinion and in practice, Naegele's Rule has been used as a yard-stick in estimating the maturity of a pregnancy and in calculating the expected date of delivery. The addition of 9 months and 7 days to the first day of the patient's last menstrual period gives one the expected date of delivery. In the majority of cases approximately 97.5 per cent of deliveries occur either a week earlier or later than the expected date leaving about 2.5 per cent of cases as problems. It is a biological marvel of nature that there are certain set gestation periods for the various species of animals including human beings. For ourselves, the "normal" gestation period is 280 days but there have been cases to prove and to be accepted by law where pregnancy and gesta-

tion can exceed this period tremendously. I refer to the two well know cases in the British (English) Court of Law, *viz.*:—

Gaskill versus Gaskill Case—Pregnancy 331 days

Preston versus Preston Case—Pregnancy 360 days

The use of dates will certainly have many limitations in the diagnosis of a prolonged pregnancy. Naegele's rule would be satisfactory if one assumes the case to have regular periods with definite cycles and with ovulations within normal time limits. Mistaken dates, however, account for more errors in diagnosing postmaturity than many other factors and in our own communities, how many of us have come across cases who cannot remember their dates with accuracy and who do not have regular cycles. Another source of error is accounted for the fact that it has been shown possible to have coitus induced ovulation and similarly it has also been shown that spermatozoa have been found to be viable and alive in the region of the cervical canal for as long as 14 days instead of the normally accepted period of 24-48 hours.

It is suggested that perhaps, Naegele's Rule could be more accurate if the E.D.D. is calculated from the last day instead of the first day of the patient's last menstrual period.

**2. Estimation of the Size of the Uterus:**

This method would be of scientific value if the uterine enlargement in the course of a pregnancy was standard and uniform for all parities and for all racial and environmental groups. But this certainly cannot be accurate in view of the fact that babies come in all sizes for the same maturity and women present with different shapes and sizes as to make this method entirely unreliable. But as Wrigley has pointed out that if the case is examined by the same pair of hands from the early weeks of pregnancy, the examination and impressions should have enhanced value.

**3. Estimation on the Basis of Foetal Quickening:**

The usual estimated time for the experience of quickening in a pregnancy is 16 weeks. If a case is seen from the beginning of a pregnancy and assuming one is dealing with a sensible individual, this method would appear to be of some value in estimating the E.D.D. of the case. But here again, we have occasions to be dealing with cases who cannot appreciate quickening even at 28 weeks and there will be others who are at the other extreme of appreciating quickening even when not at all pregnant.

**4. Estimation on Basis of the Size of the Foetus:**

For the same reasons as stated for the method of estimation based on the size of uterine enlargement, this method will only be of scientific value if growth of babies were standard for all conditions. Wrigley has been stated that there can no more be an "exact time" for a gestation than an "exact weight" or an "exact height" for every one. However, it will be of some assistance if, here again, the case is examined by the same pair of hands throughout the antenatal period from early in pregnancy.

**5. Vaginal Assessment of the Cervix:**

It is generally agreed that the nearer to maturity a pregnancy—the "riper" is the feel of the cervix on vaginal assessment. A ripe cervix in most instances is associated with a well engaged presenting part and with a lower segment commencing to thin out or as it were taken up. One of the difficulties of this method of assessment is that in cases of incipient or established premature labour, the findings will not be dissimilar. However, it has been stated that vaginal assessment will, in the case of a cephalic presentation, find a hard skull. In some cases almost closed fontanelles may be felt by the examining fingers.

**6. Uterine Irritability:**

By tocographic studies on the threshold of uterine response to small test doses of oxytocics—uterine irritability can be used to assess the imminence of labour in a pregnancy. It is reasonable to state that the closer to maturity a pregnancy, the more will be the uterine irritability index. This test devised by Smyth actually is used to predict the success of a surgical induction of labour. Small increasing doses of oxytocics ranging from 0.01 to 0.1 unit are used in this test. There will be many fallacies to this test as a primigravid uterus

will respond differently to a multigravid uterus and still more differently from a grand multiparous uterus. Also, it would appear that for a given individual, there will be a different threshold value of oxytocics to induce the same uterine irritability.

**7. Radiological Assessment of Maturity:**

The use of X-Rays as possible methods to estimate maturity in a pregnancy has been cited but I think our Radiological colleagues here are themselves reluctant to make any definite opinion about the maturity of a pregnancy when such is asked for. I believe they feel that beacuse of the wide variations and the difficulties in visualising the ossification centres, the estimates usually fall short of the correct maturity. Three possible methods involving X-Rays have been described as follows:—

*a)* **Foetal Mensuration:**

In a well flexed foetus, the total length of a foetus is usually double the distance estimated from the breech to the vertex and in an average pregnancy and average sized foetus, at term, this length is not less than 50 cms. Unfortunately, here again, there are variations from case to case and generally, this method is of more value in helping to discern the maturity in a premature pregnancy than in a mature pregnancy.

*b)* **The Ossification Centres:**

This method would be reliable provided that the ossification centres can be well identified in the cases presented. Technical difficulties are involved in securing proper exposures of the required bones to display the ossification centres. The following ossification centres are generally studied:—

1. The Cuboid bone—appearance of ossification centre suggests maturity.
2. The upper end of the Tibia—appearance of ossification centre also implies a Term pregnancy.
3. The lower end of the Femur—appearance of ossification centre implies a week before term maturity.

Errors up to four weeks have been recorded using this method and this again shows the deficiency involved.

*c)* **Cephalalometry:**

It has been estimated that in a full term pregnancy, the bi-parietal diameter of the head should average 3.75". The same diameter averages about 3" at the 32nd week and increases by 0,1" per week. Here again—cephalometry has proved disappointing because of the technical difficulties such as the attitude of the foetal skull, the distance from the X-Ray tube and the penetration of the X-Ray. Errors up to about 25 per cent have been recorded making the method also very unreliable for such a purpose.

## B. Retrospective Methods:

These actually involve a particular study of the babies at birth and as such, will really not be of much help when one is faced with the problem of induction of labour in a case where a prolonged pregnancy is suspected. In any case, the descriptions are authentic to make one realise that the problem of post-maturity does really exist. Two descriptions of a Post-Mature Baby are documented as follows:—

**1. Finn Boe Index:**

Finn Boe is of the opinion that one can say that a baby is certainly post-mature with great confidence if the following three indices are fulfilled:—

*i)* The Pregnancy had exceeded 290 days.

*ii)* The foetal length is longer than 54 cms.

*iii)* The Foetal Weight is heavier than 4,000 G (8.75 pounds).

**2. Clifford's three stages of Infant Post-Maturity:**

| | |
|---|---|
| Stage I: | Loss of Vernix |
| | Desquamation |
| | White Skin |
| | Long Nails |
| | Abundant Hair |

Alert Facies
Loss of Subcutaneous Tissues
Appearance of Malnutrition.

Stage II: Meconium in Amniotic Fluid
Meconium Staining of Contiguous Structures
Signs of Foetal Hypoxia.

Stage III: Change in Pigmentation from Green to Yellow.
Early maceration of the skin.

## C. Laboratory Methods on the Basis of Placental Dysfunction:

Placental dysfunction is intimately related to intra-uterine foetal hypoxia and according to Walker, the real danger of the cause of death of the foetus in a prolonged pregnancy —uncomplicated by any other condition—is anoxia and hypoxia.

### 1. Studies of Oxygen Content, Oxygen Saturation and Oxygen Capacity in Cord Blood:

Walker and Walker at Turnbull have shown the following figures in respect of the above studies in post-date pregnancies:—

| Maturity | 02 Content | Os Saturation |
|---|---|---|
| 30th week | 14 vols. % | 70 per cent |
| 39/40 ,, | 12 ,, ,, | 60 ,, ,, |
| 43rd ,, | 8 ,, ,, | 30 ,, ,, |

An oxygen saturation of 30 per cent is a critical level and a further fall will cause intra-uterine death. The work of Walker has received some support from Mackay and Clemetson et Churchman but Bancroft-Livingstone and Neil using spectro-photometric techniques have shown differing figures.

### 2. Studies on the Rate of Uterine Blood Flow:

Attempt to ascertain the state of placental function by studies on the rate of uterine blood flow has been made by Morris, Moore and Myerscough and Brundennel. This involved the use of radio-active Na 23 and the inference held is that the rate of uterine blood flow was reduced in a primigravid pregnancy past term and that Toxaemia, Hypertension, Hydramnios and Diabetic pregnancies also show a reduction in the rate of this flow. However, in view of the variable results that have been produced these studies cannot give any concrete or positive significance.

### 3. Hormone Studies:

Significant advances have been made in the study of placental function and dysfunction by Zondek and Pfeiffer and also by Greene, Touchstone and Fields. The estimation of urinary estriol excretion is the basis on which their work has been based and it is generally considered that development of these studies will provide a specific answer as to prediction of the occurrence of the state of placental dysfunction in a pregnancy. Thus, for example, it is noted that the average normal excretion is 10 mgm Estriol in 24 hours but where this value is decreased to 4 mgm in 24 hours, a critical level has been reached and intra-uterine death will occur if further falls occur.

## Conclusion:

These then, are the problems involved when we have to decide whether a pregnancy has gone prolonged and whether the prolonged pregnancy is going to lead to some tragic event such as an intra-uterine death or an unexplained still-birth. This is a prediction, which under present knowledge is difficult to make. Most of us are aware of the dangers of a genuine biologic post-maturity and if we can seed this out from amongst those cases with a post-date or prolonged pregnancy, the situation will be most pleasant.

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