Gestational Age – Fact or Fallacy?

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SUMMARY

A historical review reveals that Naegele’s rule was based on anecdotal evidence. This rule should be reviewed and calculations of true gestational age should be based on the probable date of ovulation and conception.


Contemporary perinatology is fundamentally dependent on the accurate calculation of the gestational age of the fetus or neonate. Previous concepts such as ‘prematurity’, based on a birth weight of less than 2 500 g, have been supplanted by the realization that ‘pre-term’ is a better reflection of fetal age. Utilizing techniques such as ultrasound and dynamic neonatal scoring systems, perinatologists claim to be able to ‘date’ the neonate to within 7 days, and we accept a statement such as, for example, ‘32 - 33 weeks by gestational age’, as a reasonably accurate assessment.

We think of the average duration of pregnancy as being 40 weeks, yet the origins of this calculation are lost in antiquity and we do not realize that the so-called ‘Naegele’s rule’ was based on anecdotal and historical evidence. We still use ‘Naegele’s rule’ to calculate the expected date of delivery by adding 7 days and 9 months to the first day of the last menstrual period. However, Franz Karl Naegele (1778 - 1851), a highly esteemed practitioner of Heidelberg, believed that the duration of pregnancy was 10 menstrual cycles and therefore, on average, 280 days. This seems to have been based on historical evidence rather than on large series of observations, and was surprisingly accurate for the average 28-day cycle. Naegele also gave his name to a particular determination of ovulation, 14 days prior to menstruation, having written extensively on the theory of ovulation and released uterine distension. His theory was that pregnancy lasted until the eleventh month, or 42 weeks, somewhat ‘postmature’ by our standards.


The belief that the menstrual or ovarian cycle continued during gestation and determined the duration of...
probable date of ovulation before calculating the duration of pregnancy.

It is open to question whether today, despite our knowledge of the endocrinal control of ovulation, we are more accurate than the ancient Romans in calculating the gestational age. To them the time was relatively unimportant, but we base critical clinical decisions on the supposed accuracy of gestational age, and the acceptance of 40 weeks as 'term'.

There are a few fundamental questions which we should attempt to answer. Why in humans as opposed to other higher mammals is there this wide variation in the length of gestation? Were the Romans not correct in calculating 42 weeks? This is certainly not an unusual duration of pregnancy for the healthy, well-nourished pregnant patient and is it perhaps the high incidence of preterm labour among a large percentage of the population which has 'brought down the average'. No doubt preterm labour, common in less well-nourished patients, was prevalent in the time of Naegele, Denman, Montgomery and others who sought to make this elusive calculation. In Aberdeen the incidence of preterm labour (before 37 weeks) in primigravidas in the lower social classes is 8.4% compared with only 4.3% in classes 1 and 2. The prevailing incidence of preterm labour would therefore obviously have influenced the calculation of the average duration of labour.

Is there perhaps a genetic, racial, or even a geographical variation? Anderson et al. in the USA calculated the average duration of pregnancy among Whites to be 279 days for male and 279.9 days for female infants, whereas among Blacks the figures were 274.7 and 273.3 respectively. Similar but slighter differences were shown between Whites and Blacks by Malan et al. in Cape Town, and also by Barron and Vessey between 'British' (279 days) and 'Jamaicans' (275 days) in London. However, Hytten and Leitch, who deal very thoroughly with the problems of gestational age, consider that socio-economic factors were probably more important in the above series.

It would, I suppose, be too much to expect obstetricians, paediatricians and neonatologists to stop speaking of a 32-week pregnancy dating from menstruation, which therefore implies that it started before ovulation! Correctly, this is a 30-week gestation or even less if the patient had a cycle lasting longer than the average 28 days — and what woman is average! We are, in fact, not calculating 'gestational age' but 'menstrual age', which is a nonsense concept.

Similarly, early ultrasonic reports on '6-8-week gestations' would be even more impressive and valuable if they were dated from the probable date of ovulation and conception.

There have been several attempts fairly recently to determine the average duration of pregnancy from a known date of ovulation. Stewart, in 135 well-documented cases, demonstrated a range of 250-285 days and Guerrero and Florez found a variation of from 253 to 277 days, with a mean of 265, in 1336 women. These are far more relevant than many larger series still persistently attempting to determine average gestation from the last menstrual period.

The time has surely come to replace the traditional 'Naegele's rule' with one which takes into account the probable date of ovulation based on that patient's average menstrual cycle. Let us at least either add or subtract the number of days the particular patient's cycle deviates from 28 to the date calculated by the old-fashioned 'Naegele's rule'.

The popular 'wheel' used to calculate gestational age should be redesigned to take this cycle variation into account and to discard the long outdated concept of continuing ovarian rhythmicity. I would be happy to assist some enterprising pharmaceutical company in designing such a calculator, which may stimulate a reappraisal of the true gestational age and duration of pregnancy.

REFERENCES