

AN EASY AND ACCURATE METHOD TO CALCULATE GESTATIONAL AGE

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SUMMARY

This paper presents a new, simple formula to calculate 'Gestational age'. The formula is easy to use and also most accurate of all clinical methods to calculate gestational age which are being currently used.

INTRODUCTION

Gestational age or Menstrual age is estimated by computing the period of amenorrhoea from the first day of last menstrual period (L.M.P.) (William's Obstetrics). This estimation forms an integral part of good antenatal care. Gestational age-estimation is useful in decision making for M.T.P.; early diagnosis of IUGR, to predict maturity of the fetus; for timing such procedures as obstetric sonographic, amniocentesis etc.

Ultrasonography is the most accurate investigation to calculate gestational age especially in early pregnancy. But it involves expenditure. The methods used currently for routine estimation of gestational age are :

(I) **Mental Calculation** : This is the most

widely practiced method probably due to its ease (About 85% obstetricians in India use this method - Debdas). By this method gestational age (G.A.) is calculated by multiplying the months of amenorrhoea by four; to give weeks to which are added any additional weeks or days of amenorrhoea. The drawback of this method is that it is based on the assumption that one calendar month is made up of four weeks. Which itself is wrong (except for February). Thus the G.A. calculated is falsely low. This 'error' in calculation (deficiency in days - 2/3 days per month) will go on increasing as months of amenorrhoea increase. Thus at end of 3 months there is an error of one week and at end of 9 months, the G.A. calculated is falsely low by 3 weeks.

(II) **Devices for more accurate calculation**
i) Calculating forwards on a calen-

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der - a very cumbersome (almost impractical) job.

- ii) Disc - gestation calculators.
- iii) Chronocharts (Introduced by Debdas, 1991).

Though quite accurate they are not obviously as easy to use as any mental calculation. Also, it requires the constant availability of these aids.

Probably these are the reasons why they are not very popular in India (only 11% obstetricians using them in India - Debdas, 1989).

The New Method

The method described in this paper is a modification of the 'mental calculation' described above with the intention of removing the inaccuracy of the traditional mental calculation. The method gives a formula to calculate the 'error'. (days not calculated by traditional method). If 'M' is the number of months of amenorrhoea,

This 'error' - $K = \frac{5M}{2}$ if M is even

or $\frac{5M}{2}$ if M is odd

If we add 'K' to period calculated by traditional mental calculation, we get the most accurate Gestational age. (G.A.).

Ex. 1 - If LMP was on 04.12.1992, to calculate G.A. on 10.04.1993. By traditional calculation - G.a. = 4 (4) i.e. 16 weeks + 6 days

$$\text{but } K = \frac{5(4)}{2} = 10 \text{ days}$$

∴ accurate G.A. = 16 Wks + 6 days + 10 days
= 16 Wks + 17 days
= 18 Wks + 3 days

Ex. 2 - LMP on 20.12.1992, to calculate G.A. on 10.04.1993 for ease of calculation, we calculate the period from 10.12.1992. By traditional calculation, G.A. = 4 (4) = 16 weeks. The error;

$$K = \frac{5(m)}{2} = \frac{5(4)}{2} = 10 \text{ days}$$

hence the G.A. would be 16 weeks + 10 days Since we calculated from 10.04.1993, the 10 days should be subtracted. Thus the accurate G.A. = 16 weeks.

It is well known that medical Community is rather reluctant to accept such math-

Comparison with the Commonly used methods to calculate G. A.

| | Simplicity | Accuracy | Need for a Calculating device |
|-----------------------------------|---|-----------------------------------|-------------------------------|
| 1. The New Method | Simple ± 1 day only) | High (Error | Nil |
| 2. Traditional mental calculation | Simplest | Lowest | Nil |
| 3. Using the Calender | Tidious | Highest | Yes |
| 4. Disc Calculators | Involves obligatory setting/Resetting the discs before each use | Accurate only the nearest | Yes |
| 5. Chronochart (Debdas 1991) | Simple/Ready to use | Accurate only to the nearest week | Yes |

ematical formulae. But with repeated use, when their simplicity is realised such formulae become part of the clinical practice as shown in past by formulas for calculating Total Dose Iron (TDI) requirement; electrolytes (Na+, K+, etc) requirement in cases or their deficiencies - etc.

If the period of amenorrhoea involves the month of february, for the sake of accuracy 2 days (3 if it is leap year) should be subtracted from the above calculation.

CONCLUSION

The formula described for most accurate calculation of Gestational 1 age i.e. G.A. = 4M weeks + 5M/2 (or 5M-1/2) days where 'M' is the period of amenorrhoea in months, appears to be more accurate than previously existing methods and being a simple mental calculation, the method spares the obstetrician of a calculating device.

REFERENCES

1. Debdas A. K., J. of Obstet. and Gynec. of India : 41;4,464.

Ex. 1 - LMP on 28.12.1967, to calculate G.A. on 10.04.1968 for case of caesarean. We calculate the period from 10.12.1967. By traditional calculation G.A. = 4(3) + 10 weeks. The result is 22 weeks. The new method gives G.A. = 4(3) + 5(3)/2 = 22.5 weeks. Thus the G.A. would be 18 weeks + 10 days. Since we calculated from 10.12.1967, the 10 days should be subtracted. Thus the accurate G.A. = 18 weeks. It is well known that medical Councils are in better position to accept such methods in comparison with the commonly used methods to calculate G.A.

The new method described in this paper is a modification of the 'mental calculation' described above with the intention of removing the inconvenience of the traditional mental calculation. The method gives a formula to calculate the 'gestational age' in weeks and days. 'M' is the number of months of amenorrhoea.

The formula is: $G.A. = 4M + \frac{5M}{2}$ if M is even
 or $G.A. = 4M + \frac{5M-1}{2}$ if M is odd

| Serial No. | Method | Accuracy | Complexity | Need for a Calculator |
|------------|----------------------------------|----------------------------------|------------------------------------|-----------------------|
| 1. | The New Method | High (Error ± 1 day only) | Simple | No |
| 2. | Traditional (mental) calculation | Lower | Simplest | No |
| 3. | Using the Calendar | High | Tricky | Yes |
| 4. | Line Calculator | Accurate only in the worst cases | Involves carrying out calculations | Yes |
| 5. | Electronic (Debdas 1971) | Accurate only in the worst cases | Simply to use | Yes |