

Accuracy Of Balwant Rai Regression Equation in Age Estimation of Human Foetus

*Dr. Balwant Rai, **Dr. Jasdeep Kaur, ***Proff. S.C. Anand, ****Proff. Jaipaul Singh

Editor In chief International Journal Of Dental Science ,USA
Master in Forensic odontology, **B.D.S. Kapurthala, ***M.D.S (Oral & maxillofacial surgery, Orthodontics), ****UCLan ,UK

Abstract

Determination of foetal age is of significant not only in obstetrics management but also in medicolegal cases. Many a medicolegal questions especially related to fetal age are to answered by a forensic pathologist after examining a dead foetus. A study was conducted on 20 foetus of Haryana population from the Department of Forensic Medicine. Facial dimensions viz. bizygomatic width and nasion to prosthion distance were measured by vernier caliper (having resolution 0.02, instrument private Ltd. New Delhi.) and applied Balwant rai regression equation for age estimation. This was observed that using Balwant rai regression equation there was overestimation of age compared to their chronological age.

Key Words

Nasion to prosthion a point distance, Bizygomatic width, Balwant rai regression equation.

Introduction

The age determination of foetus is important as there will be enhanced punishment, in case, criminal abortion

Reprint requests: Dr. Balwant Rai

S/o Sh. Ram Swaroop, Village Bhangu,
Distt. Sirsa, P.O. Sahuwala-First, Haryana,
e-mail : drbalwantraissct@rediffmailcom

has been performed after 28 weeks of pregnancy¹. The age of foetus may be determined from its length, weight, condition and growth of eyes, eyelashes and eye brows, growth of finger nails, location of testis, appearance of ossification centers². Some workers like Cussenot O et al³, Guihard Costa AM⁴, Maydon KL et al⁵ and Tuli et al⁶ etc. studies craniofacial dimensions for age determination of foetus at different places. Previously, we proposed a regression equation for age estimation of foetal⁷. The present study has been taken up to establish accuracy of Balwant rai regression equations for age determination from Bizygomatic width and nasion to prosthion distance of foetus.

Materials and Methods

Twenty fresh dead foetus of Haryana subjects of different gestational were collected.

The fetuses were preserved in formalin solution and soft tissues were dissected and removed from the skull. Then with the help of Martin's spreading calipers the following measurements were recorded for each case using standard landmarks :-

- A) Bizygomatic width
- B) Distance between nasion to

prosthion, and balwant rai regression equation was applied as shown below⁷

Age = 3.95+0.3 bizygomatic width

Age = 5.32+4.1 Nasion to prosthion distance

The data was statistically analysed (SPSS software).

Observations and Results

Estimated age by balwant rai regression equation and chronological age(in week) as shown in table-1

TABLE-1

Estimated age by balwant rai regression equation and chronological age(in week) in north indian population

		Age group (in weeks) calculated age	
		Distance between nasion to prosthion	Bizygomatic width
1	9	9.2	9.1
2	12	12.3	12.7
3	13	13.2	13.2
4	17	17.4	17.6
5	11	11.5	11.6
6	12	12.6	12.6
7	23	23.1	23.2
8	21	21.2	21.3
9	13	13.4	13.3
10	17	17.2	17.1
11	17	17.1	17.4
12	16	16.2	16.3
13	32	32.1	32.2
14	26	26.2	26.3
15	23	23.1	23.2
16	22	22.1	22.2
17	24	24.1	24.2
18	24	24.2	24.3
19	25	25.2	25.3
20	21	21.3	21.4

Discussion

We observed that overestimation of age as compared to their chronological age (Table 1). It may be due to different in geographical, genetic and environment factors. So this equation varies from population to population, hence it should be required to study on different populations. It has been reported that correlation between craniofacial dimensions and foetal age on the fetuses of North Indian Population and deduced that the correlation coefficient of superior facial height and bizygomatic width with foetal age as 0.99 and 0.95 respectively⁶. In present series it was 0.83 and 0.85 respectively at 5% level of significance but in other studied that the correlation coefficient superior facial height and bizygomatic width with foetal age as 0.85 and 0.87 respectively¹.

It has been traced the craniofacial growth curves from known foetal skulls. He opined that foetal skull may provide foetal age by means of regression curves⁴. It has been established that superior facial height can be used as a predictor of foetal ages. They found a good correlation between superior facial height and foetal age ($r=0.96$) and observed that the mean growth rate was 1.3mm 1 per week upto 34 week after which it decreased to 0.5mm per week.³

With substantially improved ultrasound imaging it is now possible to identify previously inaccessible structures, such as fetal face. The standard measurements for dating pregnancies, the biparietal diameter is virtually impossible to detain when the foetal head is facing straight up or down¹

the facial region, however, can identified and measured in an occiput posterior position and it is possible, therefore, that orbital diameters, superior facial height and bizygomatic width could be used to date pregnancies, in lieu of BDD.⁵ From the present study regression equation are derived which can be used for estimation of age of the foetus from its superior facial height and also from bizygomatic width.

Conclusion

The balwant rai regression equation calculated for both the parameters can be used for estimating the foetal age of unknown gestation period. This study will not only help obstetricians in determining gestational age but also to medicolegal experts and thus will help in administration in justice.

References

1. Rajlakshmi CH, Bidhumukhi CH. Foetal age from superior facial height and bizygomatic width : Journal of Forensic Medicine and toxicology 2001; 18 (1) : 28-30.
2. Mukherjee JB. Forensic medicine and toxicology, Arnold Associates, second edition Vol 1 1994. p. 100.
3. Cussenot O, Zeyaoui A, Hidden G. Growth of facial bones of foetus reports of the societe Anatomique de paris Surg Radiol Ant 1990; 12 : 230-231.
4. Guihard Cost AM. Estimation of foetal age from Craniofacial dimension. Bull Assoc. Anat (Nancy) 72 : 15-19.
5. Mayden KL, Tortora M, Berkowitz RL, Bracken M, Hobbins JC (1982) : Orbital diameters : A new parameter for prenatal diagnosis and dating : Am J Obstet. Gynaecol 144(93) 289-297.
6. Tuli A, Choudhary R, Agarwal S, Anand S, Garh K. Correlation between craniofacial dimensions and foetal age, Journal of anatomical society of India 1995; 44(1) : 1-12.
7. Rai B, Anand SC, Jain R, Dhattewal SK.

Determination of foetal age: Bizygomatic width and nasion to prosthion distance. Int. Journal Of Forensic Science.2007 (www.ispub.com)