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ORIGINAL ARTICLE

Sex Chromatin in Female Neonates born at Dr. Cipto Mangunkusumo General Hospital Jakarta

by

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Abstract

Buccal smears from 147 fullterm newborns have been studied. Twenty-nine newborns who had negative sex chromatin, were male infants.

Hundred and eighteen newborns with sex chromatin positive were females, showing a lower incidence than previously reported. The peak value was on the 3rd day of life and lowered thereafter.

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Introduction

After Barr and Bertram (1949) had discovered the chromatin body in the nerve cell of a female cat many authors tried to find this in other body tissues of different species. Different technics and staining methods were used (Culling- 1966; de Robertis et al., 1970; Moore and Barr, 1955; Sinclair, 1972; Smith et al., 1962; Taylor, 1963). Since Barr body is found in higher frequencies in females, it is also called sex chromatin (de Robertis et al., 1970).

Buccal smears from the oral mucosa was introduced by Moore and Barr (1955) to detect sex chromatin in epithelial cells. This body appears in the Interphase nuclei, attached to the nuclear membrane, has a roughly planoconvex shape and is Feulgen positive (Culling, 1966; de Robertis et al., 1970; Moore and Barr, 1955).

To-day the study of sex chromatin has a wide field of medical application and offers possibilities of relating the origin of certain congenital diseases to chromosomal anomalies (de Robertis et al., 1970; Jacobs et al., 1960; Segal and Nelson, 1957).

The incidence of sex chromatin in normal adult females varies about 44% (Jacobs et al., 1960) and 20 - 79% (Segal and Nelson, 1957). Smith et al. (1962) and Taylor (1963) reported a lower incidence of sex chromatin in normal newborn females on the first 2 days of life which showed a peak value on the third day (range 4 - 49%).

Gharib et al. (1974) found a lower incidence of sex chromatin (range 0 - 16%) in Iranian newborn females than that reported by other authors (Smith et al., 1962; Taylor, 1963). No differences were detected in the first days of life.

Discrepancies in sex chromatin incidences stimulate us to study the frequency of sex chromatin of the newborn in our hospital.

Material and Methods

Buccal smears were obtained from 156 fullterm newborn at Cipto Mangunkusumo General Hospital, Jakarta, between September 22, 1975 and March 24, 1976. The materials were taken with stainless steel spatulas from the mucosa of the cheek and gently smeared on the glass slides previously coated with Mayor's egg albumen.

From every infant 2 slides were made, which were coded without knowledge of sex and age of the infant. The slides were immediately fixed with Papanicolaou's solution.

One slide was stained with Aceto-Orcein stain and the other with Feulgen stain or Shorr stain, if the result is doubtful. Besides buccal smear, peripheral blood films were made, stained with Wright stain which acted as control.

The codes were broken after the smears had been read. Aceto-Orcein procedure :

— After fixation with Papanicolaou's solution for about 2 - 24 hours, the

slides were stained with Aceto-Orcein in the staining jar for about 30 minutes.

— Replaced to alcohol 95% (2 changes), to clean the stain excess.

— These slides were dried uncovered at room temperature.

With this staining technics, the slides could be retained for about 40 days at room temperature.

One hundred unshrunken, non-pyknotic and non-overlapping cells were examined and counted with 1000 × enlargement. Nuclei with planoconvex shaped body attached to the Nuclear membrane were scored as positive.

Results

Slides from 156 newborns were examined. Nine newborns were excluded from the study because of showing icterus during the study.

Twenty-nine newborns showing negative sex chromatin by Aceto-Orcein, Feulgen method and Drumstick count for 3 to 5 consecutive days proved to be male infants after the codes were broken.

Slides showing negative sex chromatin by Aceto-Orcein stain, but were sex chromatin positive by Feulgen method and Drumstick count proved to be belonging to female newborns.

The incidence of sex chromatin :

Age (in hours)	< 24	< 48	< 72	< 96	< 120
No. of female newborns	108	118	101	43	19
Range	0 - 20	0 - 22	1 - 21	0 - 15	1 - 9
Mean	4.01	5.30	6.51	5.60	4.15
Variance	11.92	13.18	15.81	11.91	4.25
S. D.	3.45	3.63	3.97	3.45	2.06
S. E.	0.33	0.33	0.39	0.53	0.48

The mean of sex chromatin incidence in Newborn females is lower than 7% (ranges 4.01 - 6.51).

The differences of mean values of the 1st to the 5th day were significantly shown through an analysis of variance. ($0.001 < p < 0.01$).

The peak incidence of sex chromatin in newborn females happened on the 3rd day of life. The mean values on the 1st to 3rd day of life differed significantly ($p < 0.001$).

Discussion

Our study showed that the mean incidence of sex chromatin of newborn females was less than 7%, which is much lower than claimed by previous authors (Jacobs et al., 1960; Moore and Barr, 1955; Segal and Nelson, 1957; Smith et al., 1962; Taylor, 1963) except Gharib et al, (1974). The reason of the differences is as yet unknown. It might be due to racial factors. Further studies are necessary.

Differences in the mean values of the incidence of sex chromatin in the first 5 days of life, with the peak on the 3rd day was observed, which is in accordance with the finding of Smith et al. (1962) and Taylor (1963). The reason of this finding may be a reflection of the altering of blood oestrogen levels, as suggested by Smith et al. (1962) and Canki et al. (1974).

We suggest that examination of buccal smears on sex chromatin could be done on the 3rd day of life since the highest frequency occurred on that day.

The staining method used in this study is simple and gives satisfying results.

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REFERENCES

1. BARR, L.M. and BERTRAM, E.G. : A morphological distinction between neurons of the male and the behaviour of the nuclear satelite during accelerated nucleoprotein synthesis. Nature 163 : 676 (1949).
2. CANKI, N.; STAMPAR-PLASAJ, B.; BUJANOVIC, V.; TAJIC, M. and BICANIC, A. : Le Corpuscle Chromatinen chez les Prematures de sexe Feminin. In Proceeding's book of XIVth International Congress of Paediatrics. Vol. 10. (Genetic metabolism), Buenos Aires 1974.
3. CULLING, C.F.A. : Staining affinities and Cytological properties of the sex chromatin; in Moore's The sex chromatin (Saunders, Philadelphia/London 1966).
4. DE ROBERTIS, E.D.; NOWINSKI, W.W. and SAEZ, F.A. : Sex determination and human cytogenetics. Cell biology, 5th ed. (Saunders, Philadelphia/London/Toronto 1970).
5. GHARIB, R.; SHARIF. H.; AZADEH, B. and MOHALLI, E. : Sex Chromatin in Iranian Newborn Females. In Proceeing's book of XIVth International Congress of Paediatrics. Vol. 10. (Genetic metabolism), Buenos Aires 1974.
6. JACOBS, P.A.; HARDEN, D.G.; CLOSE, H.G.; MAC GREGOR, T.N.; MAC LEAN, N. and STRONG, G.A. : Abnormalities involving the Chromosom in women. Lancet i : 1213 (1960).
7. MOORE, K.L. and BARR, M.L. : Smears from oral mucosa in the detection of chromosomal sex. Lancet ii : 57 (1955).
8. SEGAL, S.J. and NELSON, W.O. : Developmental aspect of Human Hermaphroditism: The significance of sex chromatin patterns. J. Clin. Endocrinol. 17 : 676 (1957).
9. SINCLAIR, R.A. : The sex chromatin marker in the endothelium of paraffin embedded renal and cardiac tissue. J. Anat. 2 : 215 (1972).
10. SMITH, D.W.; MARDEN, P.M.; Mac DONALD, M.J. and SPECKHARD, M. : Lower incidence of sex chromatin in buccal smears of newborn females. Pediatr. 30 : 707 (1962).
11. TAYLOR, A.I. : Sex chromatin in the newborn. Lancet i : 912 (1963).