SEX RATIO IN RELATION TO DIFFERENT OBSTETRICS PROBLEMS

Thesis submitted for partial Fulfilment
for the degree of Master of Gynaecology & obstetrics

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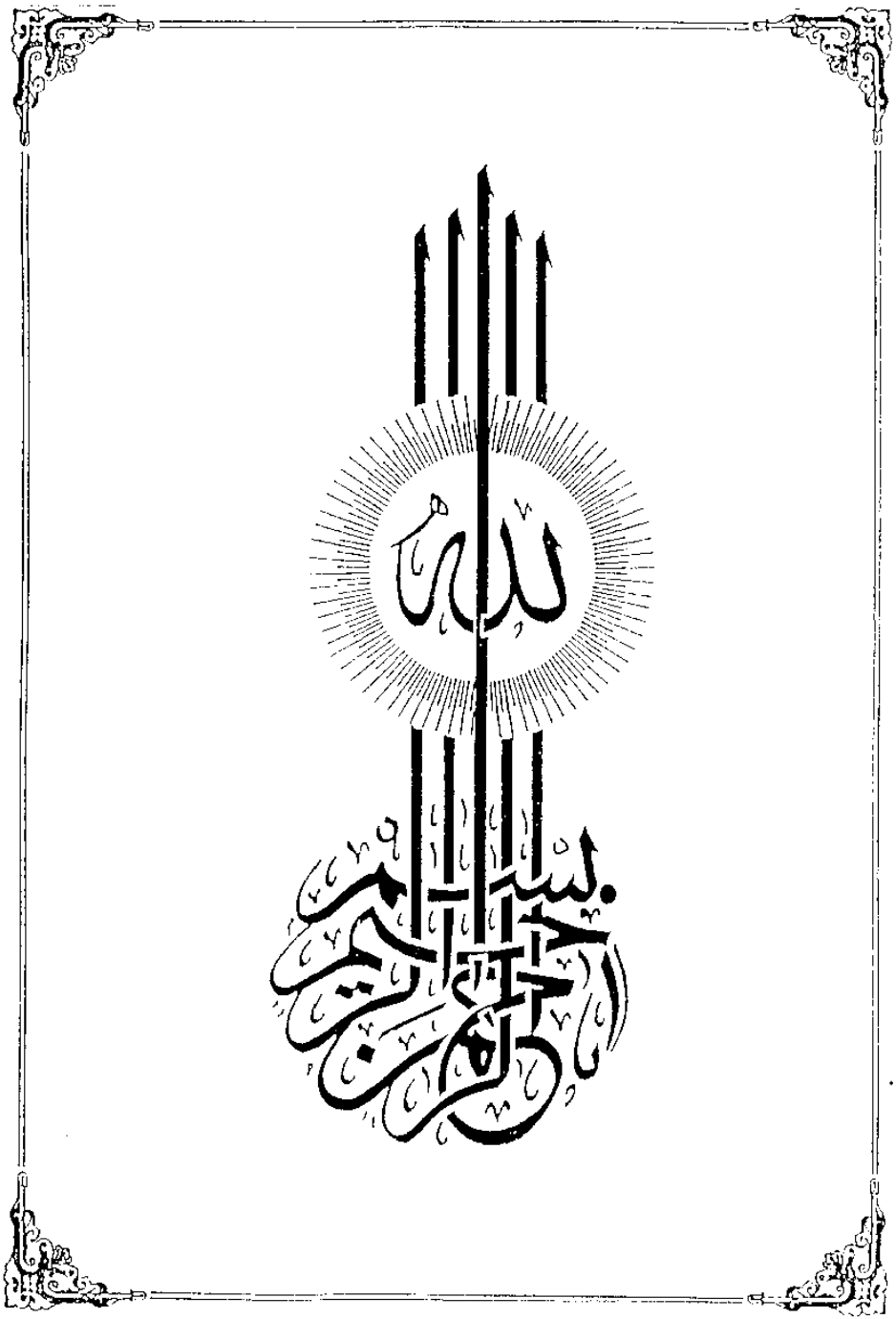
1978

بسم الله الرحمـــن الرحيـــم

" لله ملك السموات والارض يخلق ما يشاء يهب من يشاء اناثا ويهب مـــن
يشاء الذكور او يزوجهم ذكرانا واناثا ويجعل من يشاء عقيما انه عليم قدير "

سورة الشورى



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ACKNOWLEDGEMENT

To my great professor, Professor Dr. M.B. Sammour. I am particularly indebted more than I can express.

This work is but the outcome of his deep interest and continuous encouragement. It would have been impossible to begin the study rather than to complete it without the generous help of him.

It is with great honour that I take this opportunity to record my appreciation to the noble character and gentle behaviour of Prof. Dr. Sayed El Mahgoub whose suggestions and criticism have been of inestimable value in the preparation of theisr thesis.

Cordial thanks to Dr. Ibrahim Abou Serna for his continuous guidance, supervision and his valuable advice in the preparation of this work.

INTRODUCTION

Scattered papers mentioned some relation between diseases associated with pregnancy and the sex of the newborn. The studies were irrelevant in certain aspects but significant in others.

The aim of this work is to study the sex ratio of new borns in normal deliveries and in different obstetric problems.

In the following pages in brief the sex (chromos-) pattern in both male and female, antenatal diagnosis of sex the determination of sex ratio and the Factors affecting the sex ratio will be discussed. Sex is primarily determined at the moment the ovum is fertilized , by the type of sex chromosome supplied by the spermatozoon. The chromosomal pattern, even the sex chromosomal pattern varies in different animals but the nucleus of every cell of human body normally carries 46 chromosomes arranged in 23 pairs. One of these pairs the sex chromosome are mainly concerned with sex, the remaining 22 pairs are designated autosomes.

In the female, the two sex chromosomes are similar(XX). In the male the sex chromosomes are dissimilar (XY).

As a result of a reduction division the mature ovum carries 22 autosomes and one X sex chromosome. Mature spermatozoa however carry either an X or a Y chromosome and are therefore of two types. Statistically it might be expected that this mechanism would produce equal numbers of the two sexes. In fact the sex ratio amongest very early embryos is said to be 160 males to 100 females.

Two of the reasons postulated for this are :

(1) THAT the uterus is more receptive to males than females.

(2) THAT the Y carrying spermatozoa are either present in greater numbers in the semen or that they have smaller heads and greater vigour which give them an advantage in penetrating the capsule of the ovum the sex ratio at birth, however is only 106 boys for every 100 girls. THE suggested explanations for this apparent

discrepancy are :

1. THAT the estimates of the number of male zygotes quoted above is incorrect and this may well be if they are based on nuclear chromatin studies.

2. THAT male embryos have a special susceptibility to death in utero at an early stage in development Jeffcoat 1975)[36].

Establishment of the primary sex ratio in man is at present impracticable for it requires the recovery and assignment of zygotes that fail to cleave and blastocyts that fail to implant·William's obstetrics (1976)[80].

Carr's(1963)[15] studies nevertheless suggest that the primary human sex ratio may be unity.

Specific Techniques for Antenatal Diagnosis of sex.

(1) Ultra sound :

Ultra sound studies are a critical first step in nearly all types of antenatal diagnosis. In case of aminocentesis it is the bestto localize the placenta using ultrasound. Ultra sound is also utilised to determine sex by special technique measuring the length of foetal urethera.

(2) Radiologic Technique :

It is potentially valuable but it is rarely used.

The newer techniques such as the ACTA scanner developed by "Ledley"(1974)[40], which is now in use at Georgetown medical school may well provide a major revolution in the antenatal diagnosis. this technique gives alow radiation Exposure and produces a cross sectional view through any tissue, Differences in Tissue density of only 1.5% can be detected and displayed in color.

(3) Amnioscopy :

The development of a technique permitting

direct visualization of the fetus was greeted with considerable interest, the risks of the procedure remain virtually unknown.

Amniocentesis :

Since 1968 more than 4000 amniocenteses have been Done in the united states during the 12-20 weeks period for antenatal diagnosis. Development of this field was stimulated by steele and Breg (1966)[73] who demonstrated successful chromosome analysis from amniotic fluid cells between 20 and 37 weeks gestation and by improved tissue culture, cytogenetic and biochemical Techniques. Most studies are now done at about 16 weeks following the last menstrual period. Selection of this time represent a compromise of several factors.

The volume of amniotic fluid is increasing rapidly during this period and 200 - 300 c.c. of fluid is present at 16 week in contrast to less than 100 c.c. at 12 week, Moreover, cellularity is also probably increased. This allows sufficient time for cultures to be completed both for cytogenetic studies(2-3 weeks) or

biochemical studies(3-6 weeks) both full and empty bladders have been advocated at the time of amniocentesis. Complications related to amniocentesis in 955 patient (335 cases from Robinson 1973[64] et al and 600 cases from Milunsky and Atkins 1974[48].

Complication	Proportion of complication	Number possibly related to amniocentesis.
Abortion or fetal death prior to amniocentesis (in interval between caunseling and amniocentesis(Robinson et al)	8 %	0/31
After amniocentesis still births Amniotic fluid Leakor bleeding without abortion(Robinson et al)	4 % 0.1 % 2%	?2/36 0/1 case 6/6 cases known in series of 355

Data from Robinson A, et al, 1973 and unpublished material through April 1975 , Milunsky A, and Atkins L., 1974.

Although 85% or slightly greater accuracy of sex determination can be obtained using either Barr or(y) body determination, there is little reason to relay on these determinations. Since virtually a 100 % correct determination of sex can be made when akaryotype is prepared, the decisions to be made on the basis of this study are too important to permit the use of other than the optimal technique.

Even with Karyotyping , however an incorrect diagnosis of sex may be made (1-2%) of the time unless appropriate precaution are taken to assure that maternal cells are not being studied. The precautions against maternal cell contamination taken by a laboratory should be carefully investigated by the obstetrician before referring samples, the use of multiple tissue culture bottles or flasks is important. The possi bility of contaminating maternal cell either from the needle or biologic contamination can thus be checked several folds, since it is unlikely to occur in all portions of the sample equally.

Sex chromation patterns :

The number of X chromosomes in the nuclei of various cells can roughly be judged by the sex chromatin pattern, this can be studied in all tissues but clinically those most readily available for Examination are the Epithelial cells (obtained by buccal smear or skin biopsy) and Leucocytes. When more than one X chromosome is present. The nucleus contains an additional deposit of chromatin. In Epithelial cells this is disposed eccentrically and is called Barr body after its discoverer. In neutrophils it appears as a " drum stick " appendage to one of the lobes of the nucleus. This chromatin mass is found whenever two or more X chromosomes are present in the nucleus irrespective of the Y complement.

A cell which carries it is said to be chromatin positive one which does not is chromatin negative so the normal femmale cell (46 XX) is chromatin positive and the normal male cell (46 XY) is chromatin negative.

So the normal female cell (46 XX) is chromatin

positive and the normal male cell (46 XY) is chromatin negative. A cell with only one X chromosome (45 Xo) is chromatin negative , one with 47 XXY is chromatin positive, one with 47 XXX or 48 XXXY chromosomes is strongly positive since the eccentric chromatin masses vary in size or number according to the X complement . This is because only one of the chromosomes normally palys an active role in the nuclear direction of cell function. The Extra chromatin mass represents the X chromosome (S\ which is discarded or inactivated and this happens from about the twelfth days of intra-uterine life on wards.

This process of inactivation is called Lyonization of the X chromosome after its discoverer Dr. Lyon. The X chromosome which is lyonized may have come originally from either gamete so in woman it may be presumed on statistical grounds that the nuclei of half the tissue cells are motivated by an X chromosome of paternal origin, in man the active X chromosome is always a maternal one.

The Barr body first appear in trophoblast cells at

about the 12th day and in the tissues of the foetus itself by the eighteenth day. It is Also detectable in the nuclei of cells of the amonion and this offers a means of diagnosing the sex of foetus . Percentage of cells in which the Barr body is recognized microscopically varies with the preparation and the observer. A figure between 15 and 50% is accepted for Epithelial cells in the female , for leucocytes it may be only 20%.

The Y chromosome can Also be identified in the nuclei of Epithelial cells including those of the amnion by using special stains such as quinacrine hydrochloride or quinocrine mustard. These make part of its long arm fluoresce to produce abright spot in the nucleus. This can be found in all male tissues but not very easy to identify in buccal smears.

Neither the finding of the fluorescent spot nor the Barr body are, by themselves completely reliable indicatives of the sex chromosome content of nuclei. But when each is looked for as comple mentary test