PLURAL PREGNANCY

THESIS

Submitted for partial fullfilment of master degree in Obstetrics and Gynaecology

BY

AHMED MOHAMED SAGHEER

M.B.,B.Ch.

ASWAN

Under supervision of:

Prof. Dr. SOBHI KHALIL ABO-LOUZ

Professor of Obstetrics and Gynaecology

Ain - Shams University

Dr. ESSAM AMMAR

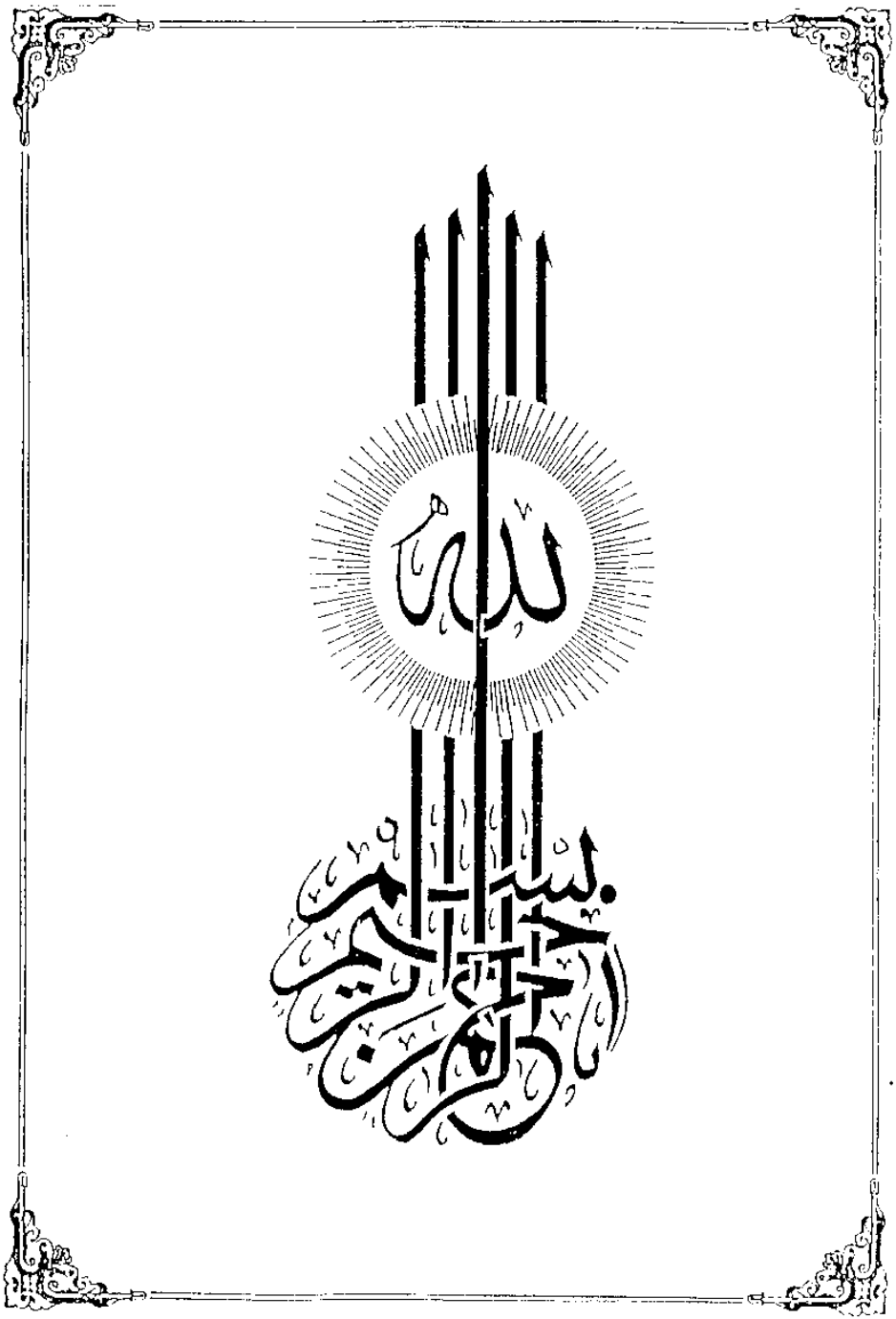
Lecturer of Obstetrics and Gynaecology.

Ain - Shams University

1989

DEDICATION

TO MY PARENTS, FOR THEIR LOVE, DEVOTION AND PATIENCE.



ACKNOWLEDGEMENT

I would like to express my sincere thanks and real gratitude to prof. **Sobhy Khalil Abu Louz** and Dr. **Essam Ammar,** for their kind support and wholehearted encouragement during the preparation of the thesis.

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INTRODUCTION

Plural pregnancy represents a real challenge to obstetricians. Hellin (1895) claimed that twins occurred once in 89 births, triplets once in 89^2 and quadruplets once in 89^3.

In Egypt - being a devloping country - it is a public health problem due to two main factors, firstly, is the limited understanding of this obstetric phenomenon by a great sector of medical attendants, and secondly, is the limited equipment facilities needed for adequate management of this phenomenon.

Most of obstetricians - in Egypt - are facing the stressful situation of patients present late in labour with undiagnosed twin pregnancy, complicated pregnancy, or even a retained second twin. Moreover, troubles may extend to the puerperium of the mother and early days of life of the neonates.

AIM OF THE WORK

Revision of the most recent advances as regard to aetiology, diagnosis and management of plural pregnancy and to do a retrospective analysis of plural pregnancy cases managed by Ain-Shams staff over the period from January 1, 1983, through December 31, 1987.

AETIOLOGY OF MULTIPLE FOETI

Twins more commonly result from fertilization of two separate ova (double - ovum, dizygotic, or fraternal twins). About one third as often, twins arise from a single fertilized ovum that subsequently divides into two similar structures, each with the potential for developing into a separate individual (single - ovum, monozygotic, or identical twins). Either or both processes may be involved in the formation of higher numbers of foeti. Quadruplets, for example, may arise from one, two, three, or four ova (Pritchard et al., 1985). The number of mature ova released from the ovary is determined by balance between the action of pituitary gonadotrophins, which stimulate the development of ovarian follicles, and the inhibitory action of the ripening follicles on the maturation of other follicles. If such inhibition fails because of endocrine imbalance, such as excessive pituitary stimulation, two or more may be released (Hafez et al., 1973).

Dizygotic twining involves the independent release and subsequent fertilization of two ova. Dizygotic twins are genetically as dissimilar as any other siblings except that they are of the same age and

are in utero in the same time. They might have different fathers if coitus occurs with two men within or relatively short period of time (Scerbo et al., 1986).

According to Pritchard et al. (1985) valid hypotheses to explain single ovum, or monozygotic twining, are lacking. Monozygotic twins arise from division of the fertilized ovum at various early stages of development as follows:

1- If division occurs before the inner cell mass is formed and the outerlayer of blastocyst is not yet committed to become chorion, that is, within the first 72 hours after fertilization, two embryos, two amnia, and two choria will develop. There will evolve a diamniotic, dichorionic, monozygotic twin pregnancy. The frequency of two choria with monozygotic twining in various reports has ranged from 18 to 36 percent (Mac Gillivray, 1978).

2- If division occurs between the fourth and eighth day, after the inner cell mass is formed and cells destined to become chorion have already differentiated but those of the amnion have not, two embryos will develop, each in separate amniotic sac. The two amniotic sacs will

eventually be covered by a common chorion, thus giving rise to diamniotic, monochorionic, monozygotic Twin pregnancy. Willson et al. (1979) reported that this occurs in most cases and accounts for 70 percent to 75 percent of monozygotic twin pregnancies.

3- If, however, the amnion has already become established, which occurs about 8 days after fertilization, division will result in two embryos within acommon a mniotic sac, or amonoamniotic, monochorionc, monozygotic twin pregnancy. This is a rare occurrence and constitutes 1 percent of all twins, and 4 percent of momozygotic twins (Hafez, 1973).

4- If division is initiated even later, that is after the embryonic disc is formed, cleavage is incomplete and conjoined twins are formed (Pritchard et al., 1985).

Triplets may originate from three zygotes, less commonly from two zygotes, and rarely from one zygote. in the commonest form trizygotic triplets (TZ) three ova are Fertilized by three sperms, whilst the other two varieties involve the division of a single zygote as in monozygotic twining. In the case of dizygotic

(DZ) triplets the combination is a pair of monozygotic twins and an individual embryo, meaning that the principles of both dizygotic and monozygotic twining are operating in the same pregnancy (Corney , 1975).

In a series of 14 triplet pregnancies Daw (1978) found double - ovum triplets to be the most frequent.

Superfecundation implies that fertilization of the two ova has occurred at different times during the same menstrual period (a condition very difficult to determine, for the difference in age is so slight). It has been proved in the lower animals. It is possible also in the human female, as was shown by the birth of twins, one of which is white and the other mulatto, to awoman who cohabits successively with awhite man and a negro (Myerscough, 1982).

In superfoetation, an interval as long or longer than anovulatory cycle intervenes between fertilizations. It has not been unequivocally demonstrated in women, although it is theoretically possible until the uterine cavity is oblitrated by the fusion of the decidua capsularis to decidua vera. Thus super foetation requires ovulation during the course of an established pregnancy, as yet unproven in human, though known to occur in Mares (Pritchard et al., 1985).

Placentation

A. Dizygotic Twins.

Percival, (1980) reported that with dizygotic twins the two ova may develop quite separately from each other, so that two separate placentae and two complete sets of membranes are formed. If, however, the two ova should be implanted close to each other in the uterus, the two placentae will be in contact, and they may even become more or less firmly united by their adjacent edges, forming apparently a single organ.

B. MonoZygotic Twins.

There are two types of placentae in monozygotic twins . The first type is mono chorionic with one single placental disc that might or might not have developed two separate amnia. Monochorionic - monoamniotic or monochorionc - diamniotic twin placentae exist only in monozygotic twins.

The second type is dichorionic - diamniotic placentae. It is present in about 8 percent of all mono zygotic twins. This type of placenta can be either fused or separated (Scerbo et al., 1986).

Vascular communications between foeti.

Foetal blood vessels may anastomose with each other on the surface of the placenta and also within the villi themselves. As aresult of this anastomosis, unequal distribution and size of the placental vessels, unequal circulation and unequal nutritional conditions may occur. The heart of one foetus, because of better circulatory advantage, may overpower that of the other via the anastomotic vessels. if this occurs at an early period, the weaker heart dilates into atortous vessel and the foetus remains undeveloped as acardicus monster. If such imbalance occurs later, acondition known as foetal transfusion syndrome may occur (Greenhill et al., 1974). vas cular anastomoses between the two foetal circulations in mono chorionic placentae are quite common and are of two types : artery - to - artery and arterio venous. Firstly, artery - to - artery anoastomoses are very rare, but when they do occur they represent an acute emergency during the delivery because of shifting of blood from one twin to the other. Secondly, arterio venous shunts are more common. Shunts between the two foetal circulations, are believed to be the basis of what is known as the twin transfusion syndrome (Scerbo et al., 1986).

Chimerism.

Pritchard et al. (1985) defined Achimera as an individual with a mixture of genotypes from more than one ovum and sperm. possible mechanisms include double fertilization of one ovum, and in case of non-identical foeti, the transfer of genetic material from one across chorionic vascular anastomoses to the other. Forexample, the transfer of primitive blood cells from one dizygotic twin foetus through a vascular anastomosis to the other twin can lead to the production in the recipient of two populations of blood cells of quite dissimilar blood types, or blood chemerism. The "transfused" cells are not destroyed, since exposure of the recipient twin to the dissimilar antigens of the donor twin early in foetal development renders the recipient twin tolerant to the donor twin's tissues.

Determination of Zygosity.

Cetrulo et al. (1980) reported that gross and microscopic examination of the placenta affords a unique opportunity to determine Zygosity. They added that this determination can be easily made by examining the membranes. The existence of one sac (one amnion and one chorion is unequivocal evidence of mono zygosity. When two or more sacs are present, it is important to divide the membranes separating the sacs.

Amonochorionic placenta with only two amniotic layers separating the cavities is unequivocal evidence of mono zygosity. When three or four layers (two amnia plus two choria, with choria often fused), dip down between the separation of the sacs, the offsprings are generally dizygotic or trizygotic, however, in a small percentage of cases, we may be dealing with mono- zygotic twins. When gross dissection is unsatisfactory, microscopical examination will readily identify the number of layers in the foetal membranes.

Scerbo et al. (1986) demonstrated that in the united states, about 80 percent of twins are dichorionic and about 20 percent are monochorionic. Pathologic examination of the placenta will detect 20