THE PLACENTA AND ZYGOSITY OF TWINS

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Macroscopic examination of the placenta and histological examination of the membranous partition between amniotic sacs was peformed in approximately 1400 twin maternities in Ibadan, Nigeria.
Monochorionic placentation is mainly characterized by two layers (as opposed to four in the dichorionic one) in the dividing septum between the two amniotic sacs, as well as by the absence of a membranous ridge of tissues at the base of the septum, that is instead present in the dichorionic one.
Monochorial twins appear to be invariably MZ, whereas dichorial twins may be either MZ or DZ. In the present study the chance of being DZ was 95% in the case of single and of 99% in the case of double dichorionic placentation.

The twinning rate in Western Nigeria (approx. 50 per thousand maternities), which is the highest on record, has already been noted (Nylander 1970*a* and *d*). In this paper the results of a study of placentation and zygosity in twins born in Ibadan, Western Nigeria, are described.

MATERIALS AND METHODS

The source of the data used in this paper and the methods of collection have been described in previous communication (Nylander 1969, 1970 *a*,*c*,*d*, Nylander and Corney 1969, Nylander and Osunkoya 1970), but a brief account will be given here.
The study was commenced in University College Hospital, Ibadan, Nigeria, in 1967. Placenta and cord blood samples were collected at every multiple birth in the three major hospitals in the city. The total number of deliveries per year for these three hospitals was 12,000 and this included approximately 1400 twin maternities.
At each twin delivery macroscopic examination of the placenta was performed by the author to determine type of placentation and this was followed by histological examination of the membranous partition between the amniotic sacs to check the results. During the macroscopic examination, close attention was paid to the following aspects:
a. Whether the placenta was single or separate.
b. The number and arrangement of layers of membranes in the dividing septum between the two amniotic sacs. In monochorionic placentation the septum contains only two layers of amniotic tissue, whereas there are four layers in dichorionic placentation, the arrangement being amnion, chorion, chorion, amnion (Fig. 1).
c. The presence or absence of a membranous ridge of tissues at the base of the dividing septum. This ridge is always present in dichorionic placentae (Fig. 2*a*) and always absent in monochorionic placentae (Fig. 2*b*).
d. The presence or absence of *obvious* vascular anastomotic vessels (on the fetal surface), between the two fetal circulations (Fig. 2*b*). The presence of such anastomotic vessels almost always indicate monochorionic placentation. No definite conclusion can be drawn from their absence.

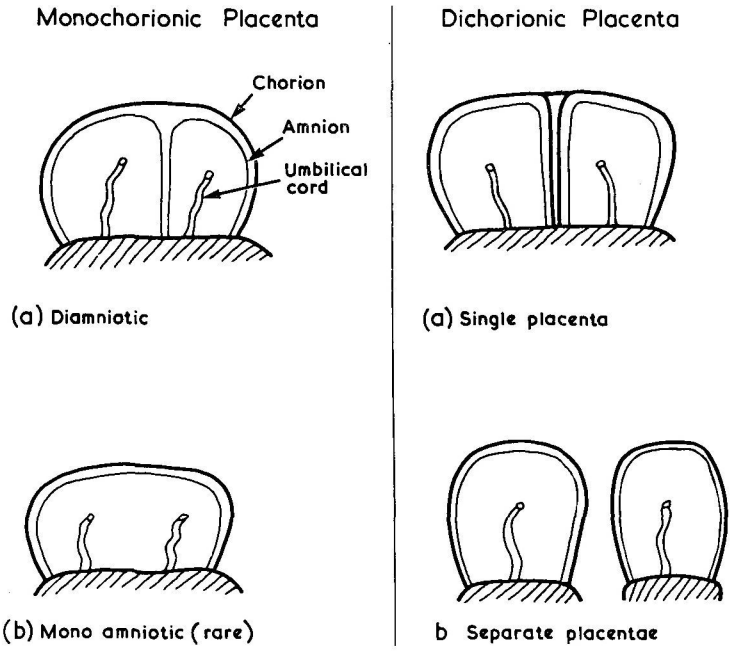
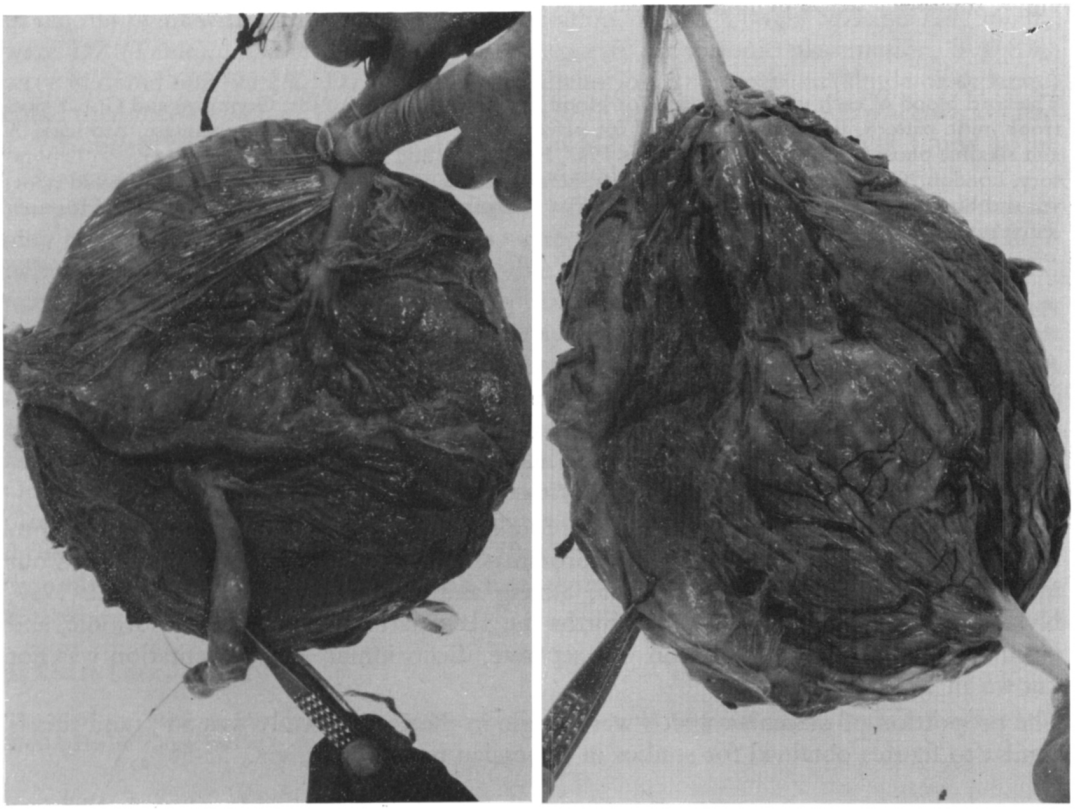


Fig. 1. Placentation of twins



a *b*

Fig. 2. (*a*) Dichorionic placenta showing ridge and (*b*) monochorionic placenta showing anastomotic vessel and no ridge

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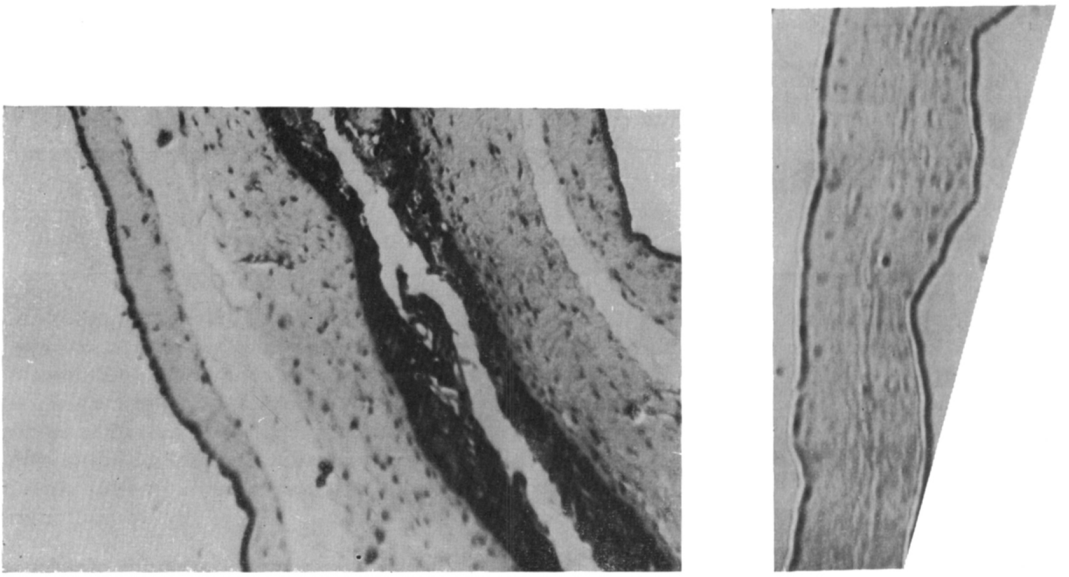

a *b*

Fig. 3. Histological section of dividing septum (*a*) in dichorionic placenta and (*b*) in monochorionic placenta

The cord blood of each twin was typed for blood group (ABO, Rh, MNSs, Gonzales) and G6PD electrophoretic pattern, in UCH Ibadan and for placental enzymes — phosphoglucomutase, peptidase A and alkaline phosphatase (Lewis and Harris 1967, Hopkinson and Harris 1968) — at the Galton Laboratory, London. Other data (maternal age, parity, height, course and complication of pregnancy and labor, sex and birth weight of babies, fetal abnormalities and perinatal mortality), were also recorded for each delivery.

PLACENTATION

A total of 1475 twin births were investigated between March 1967 and April 1969. The accuracy of macroscopic examination in determining monochorionic or dichorionic placentation was assessed by comparing the results of such examination with those obtained from histological examination (Fig. 3). The histological examination confirmed the results of macroscopic examination in every case.

As shown in the Table, 75 placentae were found to be monochorionic, corresponding to 5%, as compared with the figure of approximately 20% obtained in studies carried out in Caucasian populations (Potter 1963, Strong and Corney 1967, Edward et al. 1967, Nylander 1970*a* and *c*). In 754 twin births the placentation was single, dichorionic, and in 607 twin births the placentation was separate, dichorionic. The placentation was not known in 39 cases.

The proportion of placentae which were single in the Ibadan study was 56% and this is similar to figures obtained for studies in Caucasian populations, viz., 53-56%.

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Table. *Placentation, Sex Distribution, and Zygosity of Twins in Ibadan*

Placentation	Sex		Zygosity		
	Unlike	Like	MZ	DZ	Total
Monochorionic	—	75	75	—	75
Dichorionic:					
Single	322	432	40	714	754
Separate	290	317	5	602	607
Not known	23	16	2	37	39
Total	635	840	122	1353	1475

PLACENTATION, SEX, AND ZYGOSITY

All the 75 Nigerian twins with monochorionic (single) placentation were like sexed and identical in blood groups and the other markers. The results in twins subsequently investigated in this study has also confirmed that monochorial twins are invariably MZ. In fact, apart from an unusual case which will be mentioned later, I do not know of any authenticated case of monochorial twins which are DZ.

In the 754 twins with single dichorionic placentation, 40 (5.3%) were MZ and 714 (94.7%) were DZ (Table). In the 607 twins with separate dichorionic placentation, 5 (0.8%) were MZ and 602 (99.2%) DZ. Twins with dichorionic placentation (single or separate) could therefore be MZ or DZ, although twins with separate dichorionic placentation had a 99% chance of being DZ. The total number of MZ twins in the study was found to be 122 (including 2 whose placentation was unknown).

Since the total deliveries during the period of 1475 twin maternities was 26,200, the twinning rate was 56.3‰ and the MZ twinning rate was 100 (122/26,200) = 4.6‰. The high twinning rate in this population is therefore due to a very high DZ twinning rate, the MZ rate being about the same as in other populations.

All the twins who had monochorionic placentae in this survey were invariably of the same sex and identical in blood groups and other markers. The study was extended to other centres in Nigeria (Lagos, IgboOra, Kaduna, Zaria, and Kano) in September 1969, and approximately 4000 twin births have now been studied. It is in this extended study that the unusual case mentioned previously was discovered. The twins were delivered in IgboOra (a town in Western Nigeria) and microscopical and histological examination of the placenta showed that one half of it was monochorionic and part of the other half was dichorionic (Nylander and Osunkoya 1970). The babies were of different sex. This is the only case of its kind on record and further investigations have shown chimerism in the babies.

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