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Maternal Age and Parity in Placenta Praevia

BY

L. S. PENROSE, M.D. (Cantab.),

Research Medical Officer, Royal Eastern Counties Institution, Colchester.

I. INTRODUCTION.

MULTIPARITY is said to be a powerful predisposing cause of placenta praevia.[1] The frequency of the condition is of the order of 1 per 1,000 labours but it accounts for about 5 per cent of cases of maternal mortality[2] and a still higher percentage of stillbirths.[3] Two types of placenta praevia are distinguished clinically. The placenta may be found to cover the os com-completely (central type): these cases are distinguished from those in which the placental area partly covers the os or has encroached upon the lower uterine segment but has not yet reached beyond the internal os (marginal, lateral, partial or incomplete type*). The two types are said to differ embryologically in that the central type is probably a basal placenta whereas the types which are not central may often be due to capsular extension.[4, 5]

There are some foetal diseases in which it can be easily demonstrated that either multiparity or the age of the mother is a predisposing cause. In most textbooks on children's dis-

* Opinions differ as to what is the correct use of these terms. In this paper "marginal" is taken to mean that the placenta overlaps but does not completely cover the os, and "lateral" is taken to mean that the placental edge does not reach beyond the internal os.

eases, the likelihood of finding that a mongol is last born in a long family is mentioned.[6] Recent investigations have tended to show that there are other conditions, like congenital hydrocephaly and anencephaly, the incidence of which has the same peculiarity.[7, 8] In the case of mongolism, it can be demonstrated that the predisposing factors which depend on maternal age are so important that, in comparison with them, any effect of multiparity is quite insignificant.[9] In the case of other foetal abnormalities, the relative importance of these two factors is not yet known. The association of incidence with maternal age is not confined to abnormalities, for there is strong evidence that the incidence of fraternal twins is affected by maternal age: whether the order of birth of twins has importance as well is not clear from the existing data.

In view of these investigations and of the importance to maternal and foetal health of placenta praevia, it is of interest to investigate statistically the relation of this condition to the two factors of maternal age and maternal parity. A disadvantage, which is inherent in all histories taken at hospital at the time of a patient's being treated, is that the subsequent events cannot be taken into consideration in the analysis of the data. When questions of position in family are studied, this disadvantage is serious. Every obstetric case will be recorded as that of a last-born child. In order to minimize the errors which might creep into the results on account of this peculiarity of hospital records, the investigation of cases of placenta praevia which is described here, was carried out on patients who had been treated in hospital, on the average, 7 years ago. The family history in every case was followed by a personal visit; the number of the mother's pregnancies and the outcome of each were carefully recorded. The data consist of 69 maternal histories, in each of which placenta praevia occurred at least once; in three families it occurred twice.

The cases were treated at Addenbrooke's Hospital, Cambridge, or at the general hospitals in Bury St. Edmunds, Ipswich, or Norwich. By the kindness of the medical staffs of these hospitals the notes were made available for study. The families were all traced and visited by Miss D. A. Newlyn. Miss H. Lang Brown assisted in the arrangement of the data. A summary of each case and the maternal history is given in Appendix I. A subsidiary group of cases (Appendix III) was obtained by Dr. M. Penrose from the records of the Royal Free Hospital, London.

II. Clinical Notes.

In the group of cases on which the main investigation was based there were 38 male children, 29 female children, and 5 whose sexes were not ascertained. It is impossible to infer from these figures whether the sex of the foetus has any significant bearing on the site of the development of the placenta, but the relative excess of males is perhaps worthy of note. Of these 72 children 25 survived, with health apparently unimpaired; in 5 cases the mother died.

Analysis of the information obtained from the hospital records is of some interest in assessing the value of treatment in these cases. Caesarean section was the treatment in 19 cases; in one of these instances the mother died, and in 6 cases the child was stillborn or survived only a few hours. The method of version and delivery after pulling down a leg was applied in 22 cases; in all these the mother survived, but the foetus was stillborn in 19 instances. Other forms of treatment, such as plugging or allowing spontaneous delivery, were less favourable from the point of view of the mother (3 deaths out of 29 cases) and the child died in 20 instances. In two cases the type of treatment could not be ascertained. The figures suggest that Caesarean section is the most satisfactory form of treatment from the point of view of the child and scarcely less favourable than version and extraction from the point of view of the mother. (See Table I.)

Table I.

Survival Rates of Mother and Child in 72 Cases of Placenta Praevia.

Treatment.	Mother.	Child.
Caesarean section	18 out of 19	13 out of 19
Podalic version	22 out of 22	3 out of 22
Other	26 out of 29	9 out of 29
Not specified	1 out of 2	0 out of 2
Total	67 out of 72	25 out of 72

III. Maternal Age.

In order to investigate the significance of maternal age in the aetiology of a given condition, there are two general methods available. One is to compare the maternal ages which corres-

pond to the cases studied with those which correspond to births in the general population.[11] Unfortunately, in this country, statistics are not available which can give the normal maternal age for every pregnancy. Statistics of other countries do not necessarily make a fair comparison, and, in official figures, ages are very often inaccurately recorded. The second method, and the only one available in the present study, is to compare the maternal ages at the affected births with those at the normal births in the same families. This comparison gives exact information only in so far as the families are complete. On the other hand, if we wish merely to ask whether maternal age or birth rank (parity) is likely to be the more important aetiological factor, then the fact that a few of the families may not be complete is of no consequence. Furthermore, the ages at affected births cannot be fairly compared with the ages at normal births unless allowance is made for size of family. In any investigation in which families are picked by the presence of at least one affected member, the mean number of brothers and sisters tends to be too large as compared with the mean number in the general community.[12]

The method of comparison used here was first to allot an appropriate expectation to each pregnancy. Thus, if a family is found to contain three normal births and one case of placenta praevia, the random chance—that is, expectation—of the occurrence of placenta praevia at each of the four pregnancies is one quarter. For purposes of attributing these expectations, miscarriages were excluded. After allotting the expectations in each family, the total expectation was added up for each year of maternal age: the result of this calculation is given in Table II where the expected and observed numbers of cases of placenta praevia at each maternal age are recorded. The expected mean maternal age at normal births is seen to be 29.10 years; the observed mean maternal age of all the cases of placenta praevia is 31.86 years. The difference between these two means is therefore 2.76, and this is a highly significant value in the statistical sense: it is nearly four times the standard error, which is ±0.71 years. From this calculation there is a good prima facie case for believing that maternal age is a factor of significance in the aetiology of placenta praevia. The effect might be slightly lessened had all the families in the data been finished.

TABLE II.

72 Cases of Placenta Praevia.

Maternal age in years.	Number observed.	Number expected.
16	—	0.06
17	—	—
18	—	0.75
19	1	1.15
20	1	1.82
21	2	2.75
22	2	3.55
23	5	6.44
24	4	3.78
25	—	2.41
26	6	4.76
27	—	4.38
28	5	4.03
29	3	3.32
30	2	3.29
31	1	2.74
32	6	4.46
33	4	3.49
34	3	3.74
35	2	3.08
36	5	4.05
37	2	1.75
38	2	0.70
39	5	1.23
40	2	0.94
41	3	1.95
42	3	0.67
43	—	0.33
44	2	0.14
45	—	—
46	1	0.09
Total	72	71.85
Mean	31.86	29.10
Standard deviation (σ_A) ...	—	5.99
Standard error ($\sigma_A \sqrt{72}$)	—	0.71

IV. Maternal Parity.

The comparison between expected and observed numbers of cases of placenta praevia in each birth rank is shown in Table III. There is evidently a tendency for mothers with a high degree of multiparity to be represented in the series. There is also no obvious tendency for the condition to affect the first born.

Table III.

72 Cases of Placenta Praevia.

Birth rank.	Number observed.	Number expected.
1st	20	27.65
2nd	14	18.82
3rd	15	10.93
4th	6	4.98
5th	4	3.23
6th	2	1.76
7th	3	1.52
8th	4	0.93
9th	—	0.58
10th	—	0.44
11th	1	0.34
12th	1	0.23
13th	1	0.14
14th	—	—
15th	—	0.06
16th	—	0.12
17th	—	0.06
18th	1	0.06
Total	**72**	**71.85**
Mean	3.55	2.58
Standard deviation (σ_R) ...	—	2.20
Standard error ($\sigma_R\sqrt{72}$)	—	0.26

The mean rank of all cases was not as high as might have been guessed from inspection of the data: the average number of previous pregnancies was only between two and three—that is to say, the mean birth rank for placenta praevia was 3.55. This value was higher than that of expected normal births, namely 2.58. The difference of almost one rank between

observed and expected values is statistically significant and is nearly as significant as the maternal age difference shown in Table II.

V. Relative Importance of Age and Parity.

From Tables II and III it appears likely that maternal age and multiparity are almost equally important aetiological factors in the causation of placenta praevia, but the point needs further analysis. There is more than one method by which the separation of aetiological importance of age and rank may be attempted. The most accurate method is that which was used elsewhere[13] to find out whether birth rank could have any significance in the aetiology of mongolism. This method is very laborious, and it is not reasonable to attempt it unless there is a fair likelihood that a definite result will be obtained. In the present limited amount of data, the significance of a result obtained by that method might still be in doubt. We can, however, analyse the present data by a much simpler method which, though less exact, may give suggestive results. This method involves finding out the correlation between expected age and expected rank in all the families and, for this purpose, a detailed table of expectations had to be prepared: in Table IV the ranks and ages have been grouped in order to save space. The degree of correlation of the expectations for age and rank was found to be +0.454. This calculation allows regression equations of the ordinary kind[14] to be calculated and the mean expected maternal age for placenta praevia, on the assumption that rank is of no significance, can then be discovered. This expected mean maternal age, which is actually 30.3 years,* with a standard error of ±0.63 years, is still significantly lower than the mean observed age (31.86 years).

The converse comparison can be made by obtaining expected ranks based on constant maternal age from the regression equations; that is to say, to study the effect of birth rank, or parity, by itself, we eliminate the effect of maternal age. The expected birth rank (3.04)† is still found to be below the observed value (3.55) and again the difference (0.51±0.23) is just significant. Probably, therefore, multiparity has its independent effect, though this may be less important than the effect of maternal age.

* $\sigma_A/\sigma_R(0.454)(3.55-2.58)+29.10=30.30$.

† $\sigma_R/\sigma_A(0.454)(31.86-29.10)+2.58=3.04$.

TABLE IV.

72 Cases of Placenta Praevia classified according to Birth Order and Maternal Age, with Expectations.

Maternal age in years.	Birth rank. 1	2–3	4–6	7–10	11–15	16–18	TOTAL
16–19	*1*	—	—	—	—	—	*1*
	1.57	0.39	—	—	—	—	1.96
20–24	*8*	*5*	*1*	—	—	—	*14*
	9.88	7.91	0.55	—	—	—	18.34
25–29	*3*	*7*	*4*	—	—	—	*14*
	6.04	9.13	3.53	0.20	—	—	18.90
30–34	*6*	*9*	*1*	—	—	—	*16*
	7.33	6.75	3.11	0.41	0.12	—	17.72
35–39	*1*	*7*	*3*	*5*	—	—	*16*
	1.83	5.07	2.06	1.65	0.20	—	10.81
40–44	*1*	*1*	*3*	*2*	*2*	*1*	*10*
	1.00	0.50	0.72	1.21	0.36	0.24	4.03
45–49	—	—	—	—	*1*	—	*1*
	—	—	—	—	0.09	—	0.09
TOTAL	*20*	*29*	*12*	*7*	*3*	*1*	72
	27.65	29.75	9.97	3.47	0.77	0.24	71.85

VI. CENTRAL CASES COMPARED WITH OTHERS.

The 72 cases in the present survey could be separated into three groups: those definitely described as central (21 cases), those described as marginal or lateral (39 cases), and a few in which the type was unspecified (12 cases). The mean number of pregnancies was almost exactly the same in both central and non-central groups, but the mean maternal age was greater for the central cases. (See Table V.) Calculation of the most likely maternal age which corresponds to this mean number of pregnancies reveals that, even with such a small number of cases the maternal age for central placenta praevia is significantly

TABLE V.

Source of material.	Central Placenta Praevia. No. of cases.	Average maternal age in years.	Aver. birth rank.	Marginal or Lateral Placenta Praevia No. of cases.	Average maternal age in years.	Aver birth rank.
Present series	21	33.71	3.48	... 39	31.21	3.46
Palmer[15]	3	31.00	1.67	... 8	32.25	4.12
Royal Free Hospital ...	11	34.73	2.09	... 65	31.46	3.68
Total	35	33.80	2.89	... 112	31.43	3.63

All Clinical Types of Placenta Praevia
(12 *cases of unspecified type included.*)

Number of cases.	Mean maternal age in years.	Mean birth rank.
159	31.90	4.04

These figures can be compared with the mean maternal age of 32.04 years in 3,602 cases of placenta praevia and the mean birth rate of 4.04 in 4,406 cases. (See C. Berkeley, "Unavoidable Haemorrhage," *Journ. Obstet. and Gynaecol. Brit. Emp.*, 1936, xliii, 393.)

high. On the other hand, the mean maternal age for the marginal and lateral cases is not abnormally high if the birth rank is taken into consideration.

This distinction between central cases and other types is emphasized by comparison of data from the present survey with data derived from other sources. Even in the small group of cases, described by Palmer[15] (Appendix II), for example, if allowance is made for the difference in degree of parity, the mothers in the three central cases are relatively older than the mothers in the eight non-central cases. In the material collected from the Royal Free Hospital case-notes, which is much more extensive, an even more marked distinction is shown. All data from the three sources are combined in Table V. The average maternal age for 35 cases is more than two years greater than that for 112 marginal and lateral cases although the mean number of pregnancies is less in the central cases than in the others.

On purely statistical grounds it appears likely that, between the two sorts of cases which are clinically distinguished, there lies a real aetiological difference. The observed mean birth rank for central cases is consistent with the view that, in comparison with increased maternal age, parity is of no aetiological importance. In the group of cases classified as marginal or lateral it is not possible to distinguish whether age or parity has the greater effect. Indeed, there may be included in this group some which are aetiologically related to the central type and others in which the number of pregnancies is the main determining factor. Further information on this point was not obtained, however, by the separation of these cases into two classes —those diagnosed as marginal and those diagnosed as lateral type.

Closely associated with the question of the significance of multiparity is the possibility that too short an interval between pregnancies may act as a predisposing cause in placenta praevia. Inspection of the present data, however, reveals that the interval between the abnormal pregnancy and that immediately preceding it is not unduly short in comparison with other pregnancy intervals in the families studied.

It is sometimes believed that central placenta praevia has a preference for first pregnancies but that this is not the case with the marginal type. Of the central cases mentioned in Table V, 12 out of 35, or 34 per cent, were in primparae, and only 26 out of 112, of 23 per cent, of the marginal or lateral cases were in primiparae. The greater likelihood of primiparous central cases may be due to the fact that the families are close to normal size in these cases because here multiparity does not appear to be a predisposing cause.

VII. Summary.

An investigation into the maternal histories of 72 cases of placenta praevia has been described. The material collected, together with some additional data, has been analysed in such a manner as to obtain information about the aetiological importance of maternal age and multiparity. The results suggest that increasing maternal age is a significant factor in producing the central type, though multiparity can be the chief cause in some marginal and lateral cases.

I am much indebted to Professor A. Fleming for permitting access to the notes of her cases and allowing the results to be

made use of in this paper. The work has been carried through under the auspices of the Medical Research Council and the Darwin Trust, in association with parallel inquiries into the effects of birth order and maternal age on the incidence of various abnormalities.

I am grateful to Mr. Eardley Holland for his advice and encouragement.

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APPENDIX I.

Summary of the Histories in 72 Cases of Placenta Praevia 69 Families

The pregnancies are arranged in order of birth.

* indicates the affected pregnancy in each case.

The age given is that of the mother at the time of each birth.

The figures in brackets show the expectation of placenta praevia allotted to each pregnancy except those resulting in miscarriages.

No. 1.

Mother. Now aged 42: has a contracted pelvis.

Pregnancies.

1st at age 35: forceps delivery of female child who died at 12 days. (0.33).

2nd at age 36: induced labour at thirty-second week; healthy female child. (0.33).

*3rd at age 38: central placenta praevia; Caesarean section and salpingectomy; healthy male child. (0.33).

No. 2.

Mother. Now aged 36.

Pregnancies.

*1st at age 33: central placenta praevia; Caesarean section; female child lived 31 hours. (0.50).

2nd at age 35: Caesarean section for obstructed labour; normal placenta; healthy female child. (0.50).

No. 3.

Mother. Now aged 38.

Pregnancies.

1st at age 27: normal birth of healthy female child. (0.25).

*2nd at age 32: marginal placental praevia; podalic version and extraction of stillborn female child. (0.25).

3rd at age 35: normal birth of healthy male child. (0.25).

4th at age 37: normal birth of healthy female child. (0.25).

No. 4.

Mother. Now aged 45.

Pregnancies.

1st at age 27: stillborn female child. (0.33).

2nd at age 28: normal birth of healthy female child. (0.33).

*3rd at age 32: placenta praevia; Caesarean section; healthy male child. (0.33).

No. 5.

Mother. Now aged 35: states that she had some haemorrhage after the birth of second child and had bleeding for the first two months of fourth pregnancy.

Pregnancies.

1st at age 21: normal birth of healthy male child. (0.20).
2nd at age 22: normal birth of healthy female child. (0.20).
3rd at age 24: normal birth of healthy male child. (0.20).
4th at age 27: normal birth of healthy male child. (0.20).
*5th at age 29: marginal placenta praevia; spontaneous vertex delivery of healthy female child who died of pneumonia at 1 year 2 months. (0.20).
6th at age 34: miscarriage at 2½ months.

No. 6.

Mother. Now aged 38.

Pregnancies.

1st at age 25: forceps delivery of healthy male child. (0.33).
*2nd at age 32: lateral placenta praevia; vertex delivery by Willett's forceps of female child who lived 50 minutes. (0.33).
3rd at age 37: forceps delivery of healthy female child. (0.33).

No. 7.

Mother. Now aged 38.

Pregnancies.

*1st at age 31: central placenta praevia; podalic version and extraction; spontaneous delivery of stillborn male child. (1.00).

No. 8.

Mother. Now aged 48.

Pregnancies.

1st at age 29: normal birth of healthy female child who died at 2 years of diphtheria. (0.25).
2nd at age 32: normal birth of healthy male child. (0.25).
3rd at age 34: normal birth of healthy female child. (0.25).
*4th at age 39: central pracenta praevia; podalic version and extraction of stillborn male child. (0.25).

No. 9.

Mother. Now aged 40.

Pregnancies.

*1st at age 30: marginal placenta praevia; podalic version and extraction of healthy male child. (1.00).

No. 10.

Mother. Now aged 41:

Pregnancies.

*1st at age 28: placenta praevia; spontaneous delivery of anencephalic child of unknown sex. (0.50).

2nd at age 35: normal birth of healthy female child. (0.50).

No. 11.

Mother. Died 12 years ago at the age of 28.

Pregnancies.

*1st at age 28: central placenta praevia; treatment—pituitrin; patient died; child unborn. (1.00).

No. 12.

Mother. Now aged 44.

Pregnancies.

1st at age 29: normal birth of healthy male child. (0.33).

2nd at age 30: normal birth of healthy male child. (0.33).

*3rd at age 35: placenta praevia; Caesarean section; healthy male child. (0.33).

No. 13.

Mother. Now aged 45.

Pregnancies.

1st at age 27: forceps delivery of healthy male child. (0.50).

*2nd at age 36: marginal placenta praevia; spontaneous delivery of healthy female child. (0.50).

No. 14.

Mother. Now aged 37.

Pregnancies.

1st at age 24: normal birth of healthy male child. (0.33).

2nd at age 28: normal birth of stillborn female child. (0.33).

*3rd at age 30: marginal placenta praevia; podalic version and extraction of stillborn female child. (0.33).

No. 15.

Mother. Now aged 29.

Pregnancies.

*1st at age 24: marginal placenta praevia; podalic version; healthy male child. (1.00).

No. 16.

Mother. Now aged 34.

Pregnancies.

1st at age 20: normal birth of healthy male child. (0.25).

2nd at age 24: normal birth of healthy male child. (0.25).

*3rd at age 26: marginal placenta praevia; podalic version and extraction of healthy male child. (0.25).
4th at age 32: normal birth of healthy female child. (0.25).

No. 17.

Mother. Now aged 35.
Pregnancies.
1st at age 22: normal birth of healthy male child. (0.50).
*2nd at age 23: central placenta praevia; podalic version and extraction of stillborn child. (0.50).

No. 18.

Mother. Now aged 42.
Pregnancies.
1st at age 31: normal birth of healthy female child. (0.50).
*2nd at age 33: lateral placenta praevia; podalic version and extraction of stillborn female child. (0.50).

No. 19.

Mother. Now aged 36.
Pregnancies.
1st at age 22: normal birth of healthy female child. (0.33).
2nd at age 25: normal birth of healthy male child. (0.33).
*3rd at age 28: placenta praevia; Caesarean section; healthy female child. (0.33).

No. 20.

Mother. Now aged 27.
Pregnancies.
1st at age 20: normal birth of healthy male child. (0.33).
2nd at age 22: normal birth of healthy female child. (0.33).
*3rd at age 23: central placenta praevia; podalic version; stillborn male child. (0.33).

No. 21.

Mother. Now aged 24.
Pregnancies.
*1st at age 21: marginal placenta praevia: spontaneous vertex delivery of healthy male child. (0.33).
2nd at age 22: normal birth of healthy female child. (0.33).
3rd at age 23: normal birth of healthy female child. (0.33).

No. 22.

Mother. Now aged 43.
Pregnancies.
1st at age 20: twin birth of healthy male children. (0.50).
2nd at age 23: forceps delivery of male child who had fits and died at 5 months. (0.25).

*3rd at age 32: central placenta praevia; Caesarean section; stillborn male child. (0.25).

No. 23.

Mother. Now aged 31.

Pregnancies.

1st at age 21: normal birth of healthy male child. (0.20).
2nd at age 22: normal birth of healthy female child. (0.20).
3rd at age 23: difficult birth, on account of short cord, of healthy male child. (0.20).
4th at age 25: normal birth of healthy male child. (0.20).
*5th at age 28: marginal placenta praevia; podalic version and extraction of stillborn male child. (0.20).

No. 24.

Mother. Now aged 43; had two healthy male children by previous marriage.

Pregnancies.

3rd at age 31: normal birth of healthy female child. (0.11).
4th at age 33: normal birth of healthy male child. (0.11).
5th at age 34: normal birth of healthy male child. (0.11).
6th at age 36: normal birth of healthy female child. (0.11).
7th at age 37: normal birth of healthy male child. (0.11).
8th at age 39: normal birth of healthy male child. (0.11).
9th at age 40: normal birth of healthy female child. (0.11).
10th at age 41: slight antepartum haemorrhage; premature birth of male child who lived 3 days. (0.11).
*11th at age 42: placenta praevia (not central); spontaneous delivery of stillborn female child. (0.11).

No. 25.

Mother. Now aged 47.

Pregnancies.

1st at age 21: forceps delivery of healthy female child. (0.17).
2nd at age 22: normal birth of healthy female child. (0.17).
3rd at age 23: normal birth of healthy male child. (0.17).
4th at age 26: normal birth of healthy male child. (0.17).
5th at age 29: normal birth of healthy male child. (0.17).
6th at age 34: miscarriage at 3½ months.
*7th at age 40: lateral placenta praevia; forceps delivery of stillborn female child. (0.17).

No. 26.

Mother. Now aged 41.

Pregnancies.

1st at age 30: forceps delivery of healthy female child. (0.50).
*2nd at age 36: central placenta praevia; podalic version; stillborn male child. (0.50).

No. 27.

Mother. Now aged 33.

Pregnancies.

1st at age 23: normal birth of female child who died at 1 year 3 months of meningitis. (0.25).

2nd at age 25: normal birth of healthy male child. (0.25).

*3rd at age 26: placenta praevia; Caesarean section; healthy female child. (0.25).

4th at age 29: normal birth of healthy female child. (0.25).

No. 28.

Mother. Now aged 47.

Pregnancies.

1st at age 27: normal birth of healthy male child. (0.50).

*2nd at age 35: placenta praevia (not central); podalic version; spontaneous delivery of healthy male child. (0.50).

No. 29.

Mother. Now aged 33.

Pregnancies.

*1st at age 24: central placenta praevia; podalic version and extraction of stillborn female child, 12 weeks premature. (0.50).

2nd at age 27: normal birth of healthy female child. (0.50).

No. 30.

Mother. Now aged 46.

Pregnancies.

1st at age 18: normal birth of healthy female child. (0.14).

2nd at age 21: normal birth of healthy male child. (0.14).

3rd at age 23: normal birth of healthy male child. (0.14).

4th at age 26: normal birth of female child with congenital heart lesion who died at 5 weeks. (0.14).

5th at age 31: normal birth of healthy female child. (0.14).

6th at age 36: normal birth of healthy male child. (0.14).

*7th at age 42: placenta praevia (not central); Caesarean section; healthy female child. (0.14).

No. 31.

Mother. Now aged 48.

Pregnancies.

1st at age 23: normal birth of healthy male child. (0.14).

2nd at age 28: normal birth of weakly female child, who died at 18 years of pneumonia. (0.14).

3rd at age 30: normal birth of healthy male child. (0.14).

4th at age 34: normal birth of healthy male child. (0.14).

5th at age 35: normal birth of healthy male child. (0.14).

*6th at age 41: placenta praevia (not central); podalic version; manual removal of adherent placenta; stillborn male child. (0.14).
7th at age 43: normal birth of weakly male child. (0.14).

No. 32.

Mother. Now aged 35.

Pregnancies.

1st at age 22: forceps delivery of healthy female child. 0.33).
2nd at age 23: breech delivery of healthy male child. (0.33).
*3rd at age 24: placenta praevia (not central); spontaneous delivery, but adherent placenta, of male child who lived 2 hours. (0.33).
*4th at age 26: placenta praevia; Caesarean section; healthy male child. (0.33).
5th at age 30: forceps delivery of healthy female child. (0.33).
6th at age 32: forceps delivery of healthy male child. (0.33).

No. 33.

Mother. Died 9 years ago at the age of 41 of exophthalmic goitre of 11 years' duration.

Pregnancies.

1st at age 30: transverse presentation of male child who died immediately after birth. (0.25).
2nd at age 31: miscarriage at 5½ months.
3rd at age 33: malpresentation of stillborn male child. (0.25).
4th at age 35: malpresentation of healthy male child. (0.25).
*5th at age 39: placenta praevia (not central); shoulder presentation; treatment not recorded; stillborn male child. (0.25).

No. 34.

Mother. Now aged 32.

Pregnancies.

*1st at age 24: marginal placenta praevia; podalic version and extraction of stillborn male child. (0.33).
2nd at age 27: normal birth of healthy male child. (0.33).
3rd at age 28: normal birth of healthy male child. (0.33).

No. 35.

Mother. Now aged 24.

Pregnancies.

1st at age 18: normal birth of male child who died at 10 weeks of pneumonia. (0.33).
2nd at age 19: forceps delivery of healthy male child. (0.33).
3rd at age 20: miscarriage.
*4th at age 20: marginal placenta praevia; rupture of membranes; healthy male child. (0.33).

No. 36.

Mother. Now aged 26.

Pregnancies.

1st at age 22: miscarriage.

*2nd at age 23: marginal placenta praevia; podalic version and extraction of stillborn male child. (0.50).

3rd at age 25: normal birth of healthy male child. (0.50).

No. 37.

Mother. Now aged 29.

Pregnancies.

*1st at age 21: marginal placenta praevia; breech presentation of stillborn male child. (0.33).

2nd at age 23: normal birth of healthy female child. (0.33).

3rd at age 26: normal birth of healthy male child. (0.33).

No. 38.

Mother. Now aged 34.

Pregnancies.

*1st at age 23: marginal placental praevia; spontaneous delivery of healthy female child. (0.20).

2nd at age 25: normal birth of healthy female child. (0.20).

3rd at age 26: normal birth of healthy female child. (0.20).

4th at age 27: normal birth of healthy female child. (0.20).

5th at age 31: normal birth of healthy male child. (0.20).

No. 39.

Mother. Now aged 43.

Pregnancies.

1st at age 24: forceps delivery of healthy male child. (0.13).

2nd at age 25: normal birth of healthy female child. (0.13).

3rd at age 27: normal birth of healthy female child. (0.13).

4th at age 29: normal birth of healthy female child. (0.13).

5th at age 31: forceps delivery of healthy male child. (0.13).

6th at age 33: normal birth of healthy male child. (0.13).

7th at age 35: normal birth of healthy female child. (0.13).

*8th at age 39: marginal placenta praevia; spontaneous delivery of healthy male child. (0.13).

No. 40.

Mother. Now aged 36.

Pregnancies.

1st at age 26: normal birth of healthy male child. (0.33).

2nd at age 32: normal birth of healthy female child. (0.33).

*3rd at age 33: placenta praevia (not central); spontaneous delivery of stillborn male child. (0.33).

No. 41.

Mother. Now aged 40.

Pregnancies.

1st at age 27: normal birth of healthy female child. (0.50).

*2nd at age 37: marginal placenta praevia; delivery, by Willett's forceps, of healthy female child. (0.50).

No. 42.

Mother. Died 2 years ago at the age of 29.

Pregnancies.

1st at age 26: normal birth of male child with spina bifida who lived 2 days. (0.50).

*2nd at age 29: central placenta praevia; no record of the treatment; stillborn female child. (0.50).

No. 43.

Mother. Died 7 years ago, at the age of 22, of peritonitis.

Pregnancies.

1st at age 20: normal birth of healthy female child. (0.33).

2nd at age 21: normal birth of healthy female child. (0.33).

*3rd at age 22: marginal placenta praevia; Caesarean section; healthy male child. (0.33).

No. 44.

Mother. Died 8 years ago at the age of 41.

Pregnancies.

*1st at age 41: central placenta praevia; plugging; child unborn. (1.00).

No. 45.

Mother. Died 5 years ago at the age of 33.

Pregnancies.

*1st at age 26: placenta praevia; podalic version and spontaneous delivery of stillborn male child. (0.33).

2nd at age 28: premature stillborn female child. (0.33).

3rd at age 33: premature stillborn male child. (0.33).

No. 46.

Mother. Now aged 55.

Pregnancies.

1st at age 18: normal birth of healthy male child. (0.08).

2nd at age 20: normal birth of healthy female child. (0.08).

3rd at age 21: normal birth of healthy female child. (0.08).

4th at age 23: normal birth of healthy female child. (0.08).

5th at age 23: normal birth of healthy male child. (0.08).

6th at age 28: normal birth of female child who died of measles at 1 year 5 months. (0.08).

7th at age 29: normal birth of healthy male child. (0.08).

8th at age 30: normal birth of healthy female child. (0.08).
9th at age 32: normal birth of healthy male child. (0.08).
10th at age 36: normal birth of healthy female child. (0.08).
11th at age 38: normal birth of healthy male child. (0.08).
12th at age 40: normal birth of healthy female child. (0.08).
*13th at age 44: central placenta praevia; version and extraction of stillborn male child. (0.08).

No. 47.

Mother. Now aged 41.

Pregnancies.

1st at age 19: normal birth of healthy male child. (0.17).
2nd at age 23: normal birth of healthy male child. (0.17).
3rd at age 25: normal birth of healthy male child. (0.17).
4th at age 27: normal birth of healthy male child. (0.17).
5th at age 28: normal birth of healthy male child. (0.17).
*6th at age 32: placenta praevia; Caesarean section; healthy male child. (0.17).
7th at age 38: miscarriage at 3 months.

No. 48.

Mother. Now aged 58.

Pregnancies.

1st at age 19: normal birth of healthy male child. (0.09).
2nd at age 23: normal birth of healthy male child. (0.09).
3rd at age 26: normal birth of female child who died of diphtheria at 10 years. (0.09).
4th at age 28: normal birth of healthy male child. (0.09).
5th at age 30: miscarriage at 3 months.
6th at age 31: miscarriage at 6 months.
7th at age 33: normal birth of healthy male child. (0.09).
8th at age 35: normal birth of healthy male child. (0.09).
9th at age 38: twin birth of stillborn male child and female child who lived 22 hours. (0.18).
10th at age 42: normal birth of healthy male child. (0.09).
11th at age 43: premature birth of female child who lived 12 hours. (0.09).
*12th at age 46: central placenta praevia; placenta was in two pieces, joined by a membrane: one piece covered the internal os; Caesarean section; male child, who died of scarlet fever at 5 years. (0.09).

No. 49.

Mother. Now aged 42.

Pregnancies.

1st at age 36: forceps delivery of male hydrocephalic imbecile, who died at 11 months. (0.50).

*2nd at age 41: placenta praevia; Caesarean section; stillborn female child. (0.50).

No. 50.

Mother. Now aged 46.

Pregnancies.

*1st at age 36: marginal placenta praevia; breech delivery of stillborn female child, 12 weeks premature. (1.00).

No. 51.

Mother. Now aged 29.

Pregnancies.

*1st at age 23: marginal placenta praevia; breech delivery of healthy female child. (1.00).

*2nd at age 26: marginal placenta praevia; delivery by Willett's forceps of stillborn male child. (1.00).

No. 52.

Mother. Now aged 41.

Pregnancies.

1st at age 21: normal birth of healthy female child. (0.11).

2nd at age 23: normal birth of healthy female child. (0.11).

3rd at age 27: normal birth of healthy female child. (0.11).

4th at age 29: normal birth of female child, who died of pneumonia at 1 year 6 months. (0.11).

5th at age 31: forceps delivery of healthy female child, whose right arm was injured at birth. (0.11).

6th at age 34: normal birth of healthy male child. (0.11).

7th at age 37: normal birth of healthy female child. (0.11).

*8th at age 38: central placenta praevia; spontaneous delivery with placenta of stillborn female child. (0.11).

9th at age 40: normal birth of healthy female child. (0.11).

No. 53.

Mother. Now aged 44; has a small pelvis.

Pregnancies.

1st at age 30: breech delivery of male child who lived 3 days. (0.33).

2nd at age 32: Caesarean section; healthy male child. (0.33).

*3rd at age 34: marginal placenta praevia; spontaneous delivery of stillborn female child. (0.33).

4th at age 38: miscarriage at 1 month.

No. 54.

Mother. Now aged 30.

Pregnancies.

1st at age 23: normal birth of healthy male child. (0.33).

*2nd at age 26: central placenta praevia; Caesarean section; male child, with diaphragmatic hernia and transposition of great vessels, lived 45 minutes. (0.33).
3rd at age 29: normal birth of healthy female child. (0.33).

No. 55.

Mother. Now aged 43.
Pregnancies.
1st at age 31: premature birth of stillborn female child. (0.25).
2nd at age 32: premature birth of healthy female child. (0.25).
3rd at age 33: miscarriage at 2 months.
4th at age 33: premature birth of stillborn male child with hare-lip and other deformities. (0.25).
5th at age 34: premature twin birth of 1 healthy female child and 1 stillborn female child. (0.50).
6th at age 36: normal birth of healthy male child. (0.25).
*7th at age 37: placenta praevia (not central); female child lived 24 hours. (0.25).
*8th at age 39: placenta praevia (not central); stillborn female child. (0.25).

No. 56.

Mother. Now aged 47; bleeding during 5th month of 4th pregnancy.
Pregnancies.
1st at age 16: normal birth of healthy female child. (0.06).
2nd at age 19: normal birth of healthy male child. (0.06).
3rd at age 21: normal birth of healthy male child. (0.06).
4th at age 23: normal birth of healthy female child. (0.06).
5th at age 25: normal birth of healthy female child. (0.06).
6th at age 26: normal birth of male child who died at 1 year 2 months. (0.06).
7th at age 27: membranes ruptured 2 weeks before delivery of healthy female child. (0.06).
8th at age 29: normal birth of healthy male child. (0.06).
9th at age 30: miscarriage at 4½ months.
10th at age 31: normal birth of healthy female child. (0.06).
11th at age 32: normal birth of healthy male child. (0.06).
12th at age 34: premature birth of healthy male child. (0.06).
13th at age 35: normal birth of healthy female child. (0.06).
14th at age 36: miscarriage.
15th at age 37: normal birth of healthy female child. (0.06).
16th at age 40: twin birth of healthy male child and male child who lived lived 3 days. (0.06).
17th at age 41: normal birth of healthy male child. (0.06).
*18th at age 44: placenta praevia; podalic version and extraction of stillborn female child. (0.06).

No. 57.

Mother. Now aged 22.

Pregnancies.

*1st at age 19: marginal placenta praevia; Caesarean section; healthy female child. (0.50).

2nd at age 21: normal birth of healthy male child. (0.50).

No. 58.

Mother. Now aged 38.

Pregnancies.

*1st at age 34: marginal placenta praevia; delivery by Willett's forceps of healthy male cihld. (1.00).

No. 59.

Mother. Died 7 years ago at the age of 33.

Pregnancies.

1st at age 23: normal birth of healthy female child. (0.50).

*2nd at age 33: central placenta praevia; plugging; child unborn. (0.50).

No. 60.

Mother. Now aged 43.

Pregnancies.

*1st at age 32: central placenta praevia; Caesarean section; healthy female child. (1.00).

No. 61.

Mother. Now aged 44; had some haemorrhage during first 2 months of 9th pregnancy.

Pregnancies.

1st at age 21: normal birth of healthy male child. (0.10).
2nd at age 23: normal birth of healthy male child. (0.10).
3rd at age 24: normal birth of healthy male child. (0.10).
4th at age 25: normal birth of healthy male child. (0.10).
5th at age 27: normal birth of healthy male child. (0.10).
6th at age 31: normal birth of healthy male child. (0.10).
7th at age 34: occipito-posterior presentation of healthy female child. (0.10).
*8th at age 39: marginal placenta praevia; treatment, pituitrin; breech delivery of stillborn male child. (0.10).
9th at age 40: normal birth of healthy male child. (0.10).
10th at age 43: normal birth of healthy male child. (0.10).

No. 62.

Mother. Now aged 49.

Pregnancies.

1st at age 25: normal birth of healthy male child. (0.14).
2nd at age 31: normal birth of healthy male child. (0.14).

3rd at age 34: normal birth of healthy male child. (0.14).
*4th at age 36: central placenta praevia; podalic version and extraction of stillborn female child. (0.14).
5th at age 37: normal birth of healthy female child. (0.14).
6th at age 39: normal birth of healthy female child. (0.14).
7th at age 41: normal birth of healthy male child. (0.14).

No. 63.

Mother. Now aged 40.
Pregnancies.
*1st at age 34: marginal placenta praevia; membranes ruptured; delivery by Willett's forceps of stillborn male child. (1.00).

No. 64.

Mother. Now aged 31.
Pregnancies.
*1st at age 22: placenta praevia; Caesarean section; stillborn male child. (0.50).
2nd at age 27: normal birth of healthy male child. (0.50).

No. 65.

Mother. Now aged 43.
Pregnancies.
1st at age 26: normal birth of healthy male child. (0.25).
2nd at age 29: normal birth of healthy female child. (0.25).
3rd at age 32: normal birth of healthy male child. (0.25).
*4th at age 40: central placenta praevia; Caesarean section; healthy female child. (0.25).

No. 66

Mother. Now aged 51.
Pregnancies.
1st at age 23: forceps delivery of healthy male child. (0.33).
2nd at age 26: miscarriage.
3rd at age 29: normal birth of healthy male child. (0.33).
*4th at age 42: marginal placenta praevia with 2 lobes; treatment, pituitrin; forceps, vertex delivery of stillborn male child. (0.33).

No. 67.

Mother. Now aged 38.
Pregnancies.
1st at age 22: normal birth of healthy male child. (0.33).
2nd at age 24: normal birth of stillborn male child. (0.33).
*3rd at age 29: placenta praevia; Caesarean section; stillborn female child. (0.33).

No. 68.

Mother. Now aged 31; at each parturition the placenta was slow in separating.

Pregnancies.

1st at age 18: normal birth of healthy female child.(0.20).
2nd at age 21: normal birth of healthy male child. (0.20).
3rd at age 24: normal birth of healthy male child. (0.20).
4th at age 26: normal birth of healthy female child. (0.20).
*5th at age 28: lateral placenta praevia; prolapsed cord; spontaneous breech delivery; manual removal of placenta; stillborn male child. (0.20).

No. 69.

Mother. Now aged 44.

Pregnancies.

1st at age 31: miscarriage at 4½ months.
2nd at age 33: normal birth of healthy female child. (0.50).
*3rd at age 36: central placenta praevia; podalic version and extraction of stillborn male child. (0.50).

APPENDIX II.

CASES OF PLACENTA PRAEVIA DESCRIBED BY PALMER (*Med. Res. Coun. Sp. Rep.*, Series No. 118, 1928).

Central			*Not Central*		
Reference number	Maternal age	Pregnancy number	Reference number	Maternal age	Pregnancy number
lviii	28	3	xlviii	36	3
lxx	33	1	xlix	38	9
cxxxv	32	1	liii	31	1
			lxviii	39	6
			lxix	20	1
			xci	42	5
			xcviii	24	3
			cxxxvi	28	5

APPENDIX III.

CASES OF PLACENTA PRAEVIA TREATED IN THE ROYAL FREE HOSPITAL, 1928 TO 1938.

Date	*Central* Patient's initials	Maternal age	Pregnancy number
1928	D.B.	34	3
1929	K.P.	27	2
1932	E.C.	41	3
1933	M.B.	32	1
1934	I.M	41	2
1934	A.D.	34	1
1935	R.B.	28	2
1936	F.B.	31	3
1937	F.M.	40	4
1937	J.J.	32	1
1938	F.C.	42	1

Not Central							
Marginal				*Lateral*			
Date	Patient's initials	Maternal age	Pregnancy number	Date	Patient's initials	Maternal age	Pregnancy number
1929	M.M.	33	3	1930	K.W.	26	4
1929	E.D.	39	4	1930	M.S.	24	2
1930	N.D.	37	3	1930	N.R.	29	2
1930	W.B.	29	1	1930	K.R.	39	10
1930	C.S.	25	5	1930	E.N.	38	3
1931	L.M.	31	2	1930	M.J.	33	1
1931	G.E.	28	1	1930	E.H.	24	1
1931	A.B.	35	6	1930	L.C.	25	2
1932	E.W.*	37	11	1930	V.C.	31	5
1932	R.S.	29	3	1930	F.B.	27	2
1932	M.B.	39	8	1931	K.W.	23	2
1932	E.B.	36	3	1931	S.T.	40	6
1933	S.L.	38	8	1931	E.H.	45	8
1933	A.C.	20	1	1931	E.C.	24	1
1933	B.B.	27	2	1931	W.B.	22	1
1933	C.S.	28	4	1931	D.F.†	32	1
1933	M.H.	26	2	1932	E.S.	19	1
1933	A.D.	38	9	1932	A.B.	37	2
1934	G.L.	26	1	1933	E.W.*	38	12
1934	L.S.	35	4	1933	D.F.†	34	2
1935	R.S.	43	3	1934	V.V.	35	4
1935	L.G.	26	1	1934	M.K.	42	11
1935	J.P.	36	9	1936	J.B.	24	3
1935	E.S.	34	2	1936	E.H.	26	2
1936	I.B.	28	1	1936	L.B.	31	2
1937	R.J.	25	2	1936	C.M.	43	9
1937	H.N.	30	7	1937	F.G.	31	6
1937	A.L.	24	1	1937	W.F.	33	2
1937	H.E.	27	4	1938	E.S.	34	3
1937	A.W.	28	2	1938	R.L.	33	6
1938	F.S.	29	2	1938	C.C.	35	1
1938	H.S.	33	3	1938	A.B.	36	2
1938	G.L.	33	2				

* Consecutive pregnancies.
† Consecutive pregnancies.