"FAILED FORCEPS": A REVIEW OF 100 CASES

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Occipito-posterior positions and deep transverse arrest of the head accounted for over 50% of "failed forceps" cases investigated at the Birmingham Maternity Hospital by Freeth (1950), who found that the maternal death rate was 2% and the total foetal loss was 34%. Earlier, Miller (1928) reviewed a larger series with a maternal death rate of 10% and a total foetal loss of 64%. The reduction in the mortality from failed forceps over two decades has therefore been considerable.

To confirm Freeth's findings and to see if a similar reduction in mortality has taken place in another large maternity hospital, all cases of failed forceps admitted to St. Mary's Hospital, Manchester, during the period January, 1943, to December, 1951, have been reviewed.

Undilated cervix (39%) was the commonest cause of failure. The maternal death rate was 2% and the total foetal loss was 28%.

Incidence

The number of cases admitted each year fell from 17 in 1943 to 1 in 1951 (Table I). As the total number of emer-

TABLE I.—Incidence of Failed Forceps Cases

Year	No. of Cases	% of Total Emergency Admissions
1943	17	3.2
1944	15	2.6
1945	17	2.5
1946	12	2
1947	17	2.8
1948	7	1.5
1949	8	2.4
1950	6	1.9
1951	1	0.5

gency admissions varied considerably from year to year, the failed forceps cases have been expressed as a percentage of the total emergency admissions. There is a decrease from 3.2% in 1943 to 1.5% in 1948, followed, after an increase in 1949, by a fall to 0.5% in 1951.

Aetiology

The causes of failure fall into eight groups, and each group is analysed separately (Table II). In certain cases more than one possible cause for failure was present. When this occurred the case has been classified under the more

TABLE II.—Details of 100 Cases

Group	Aetiology	No. of Cases	No. of Primiparae	Foetal Loss	Maternal Deaths	Baby Dead on Admission
1	Cervix not fully dilated	39	22	14	—	6
2	Occipito-posterior positions	22	19	5	1	1
3	Deep transverse arrest	11	9	2	—	1
4	Brim disproportion (normal foetus)	7	4	4	—	2
5	Contracted outlet (occipito-anterior)	7	7	1	—	—
6	Hydrocephalus	3	1	3	—	2
7	Brow presentation	2	1	1	—	1
8	Unknown	9	6	1	1	1
	Total	100	69	31	2	14

important cause. Thus in the presence of incomplete cervical dilatation along with an occipito-posterior position, the case has been classified under the former condition. When spontaneous delivery occurred shortly before or after admission the cause of failure could not be verified. Such cases have been allotted to Group 8.

Group 1—Cervix Not Fully Dilated (39 Cases).—All cases were treated expectantly in the first instance (Table III). If full dilatation of the cervix did not occur, caesarean

TABLE III.—Cervix Not Fully Dilated

Treatment	No. of Cases	Foetal Loss	Baby Dead on Admission	Maternal Deaths
Sedation—caesarean section	4	2	—	—
„ —rotation, mid-forceps	10	3	1	—
„ —mid-forceps	8	4	2	—
„ —low forceps	6	2	1	—
„ —normal delivery	6	1	1	—
„ —craniotomy, forceps extraction	1	1	1	—
Internal version—breech extraction	1	1	—	—
Sedation—high forceps	3	—	—	—
Total	39	14	6	—

section or forceps extraction after craniotomy was carried out, depending on whether the foetus was alive or dead. Natural dilatation of the cervix occurred in 33 cases. Of these, six were subsequently delivered by natural forces. In 27 cases forceps were applied. This high proportion is partly accounted for by the 10 cases of occipito-posterior position (including deep transverse arrest), and in the other 17 cases there was perhaps a tendency to apply forceps rather readily in the belief that, once failure with forceps has occurred, it is safer—for the baby—to deliver as soon as possible. The onset of foetal distress in one multipara with a rim of cervix was unsuccessfully treated by internal version and breech extraction.

Group 2—Occipito-posterior Positions (22 Cases).—In one case associated with a funnel-shaped pelvis caesarean section was resorted to when attempts at manual rotation failed. In cases in which the foetal heart was still audible at the

TABLE IV.—Occipito-posterior Positions

Treatment	No. of Cases	Foetal Loss	Baby Dead on Admission	Maternal Deaths
Rotation and mid-forceps	18	4	—	1
Mid-forceps, face to pubes	1	—	—	—
L.S.C.S.	1	—	—	—
Normal delivery	1	—	—	—
Craniotomy and extraction	1	1	1	—
Total	22	5	1	1

Average weight of baby, 7 lb. 13 oz. (3.5 kg.).

time of admission there were two stillbirths and two neonatal deaths from intracranial haemorrhage. The maternal death, which was attributed to shock, occurred after manual rotation and mid-forceps extraction.

Group 3—Deep Transverse Arrest (11 Cases).—All the cases in this group were treated by manual rotation and mid-forceps extraction. Shoulder dystocia caused the only stillbirth among babies alive on admission.

Group 4—Brim Disproportion (7 Cases).—The size of the baby—average weight 9 lb. 4 oz. $\pm$ 11.3 oz. (4.2 kg. $\pm$ 85 g.)—rather than contracted pelvis was the major factor in causing disproportion. In one case with a normal pelvis the baby, which was dead on admission, weighed 13 lb. (5.9 kg.). The treatment of choice for brim disproportion with a living baby is caesarean section. The poor results with the alternative, high forceps, are shown in Table V.

Group 5—Outlet Contraction (7 Cases).—In seven cases, all primiparae, contracted outlet was stated as the reason

for failure. In only one case, in which the single foetal loss occurred, was pelvic outlet contraction definitely established by the recorded measurements. In this case the inter-tuberous diameter was $3\frac{1}{2}$ in. (8.3 cm.) and the posterior sagittal diameter 2 in. (5 cm.). With great difficulty an 8 lb. 4 oz. (3.7 kg.) stillborn foetus was delivered with for-

TABLE V.—*Brim Disproportion*

Treatment	No. of Cases	Foetal Loss	Baby Dead on Admission	Maternal Deaths
L.S.C.S.	3	—	—	—
High forceps	2	2	—	—
" " perforation cleidotomy	1	1	1	—
Craniotomy	1	1	1	—
Total	7	4	2	—

Average weight of baby, 9 lb. 4 oz. (4.2 kg.).

ceps. In the other cases moderate traction with forceps effected delivery. In all the occiput was anterior and in none had episiotomy been performed before admission. I believe that soft-tissue resistance, rather than bony disproportion, caused the failure or was an important contributing factor.

Group 6—Hydrocephalus (3 Cases).—The diagnosis was made by the size of the head and the great width of the cranial sutures on vaginal examination. Treatment was by craniotomy. Bilateral episiotomies had been made in one case in which the greater part of the head lay above the brim, but such moulding had occurred that it was also visible at the vulva.

Group 7—Brow Presentation (2 Cases).—One of these cases was treated by caesarean section and the other by craniotomy, as the baby was already dead. In the latter case even after craniotomy great difficulty was encountered in delivering the head. Exploration of the uterus revealed an extensive rupture of the lower segment which was treated by supravaginal hysterectomy. The patient's recovery was complicated by a temporary uretero-vaginal fistula, but this closed by the twentieth day and she eventually did well.

Group 8—Aetiology Unknown (9 Cases).—Normal delivery or an easy low forceps extraction successfully terminated the labour in eight cases. The ninth ended fatally (Table VI). After failing to deliver with forceps the family

TABLE VI.—*Aetiology Unknown*

No.	Method of Delivery	Primipara	Time Elapsed Since Failure	Foetal Loss	Maternal Deaths
1	Born before arrival . .	—	2½ hours	—	—
2	Normal delivery on admission	—	1 " "	—	—
3	" " " " " " " " " "	1	3½ " "	—	—
4	" " " " " " " " " "	1	1 " "	—	—
5	" " " " " " " " " "	1	1½ " "	—	—
6	Easy low forceps on admission	1	3 " "	—	—
7	" " " " " " " " " "	1	2 " "	—	—
8	" " " " " " " " " "	1	1½ " "	—	—
9	Delivery of after-coming head	—	1 " "	+	+

medical attendant performed internal version and unsuccessfully attempted breech extraction. On admission the dead baby was delivered up to the head, and maternal shock was present. The after-coming head was delivered easily by the Mauriceau-Smellie-Veit manoeuvre under a general anaesthetic, the third to be administered. The uterus was not explored and the third stage was normal. Twelve hours later the patient's condition deteriorated and death occurred 24 hours later. Necropsy revealed a ruptured uterus which was unsuspected until the general condition was such that surgical intervention was no longer feasible.

Munro Kerr and Chassar Moir (1949) say, "Version (after failed forceps) is never worth while; not one in two children

is saved, and more than 10% of mothers are lost from rupture of the uterus, shock, or sepsis."

Prophylaxis

Many cases could be prevented if the accoucheur constantly kept in mind the criteria for a successful forceps delivery—namely, (1) no cervix palpable; (2) the head deeply engaged; and, if the forceps is to be applied in the home, the head should be visible on separating the labia; (3) the occiput anterior; (4) no marked contraction at the pelvic outlet; and (5) the bladder and rectum empty.

Even with a visible head the abdomen should always be examined to exclude the hydrocephalic which has so moulded that the greater part is above the brim yet is visible at the vulva. If the cervix is palpable (so often said to have re-formed) after the induction of anaesthesia, the interests of mother and baby are best served by graceful retreat without applying forceps. (An exception, however, may be made in respect of a multipara with a rim of cervix which responds easily to manual dilatation.)

Principles of Treatment

Once failure occurs the treatment of shock, if present, should be the first consideration. In this event it is advantageous in domiciliary practice to call an obstetrical flying squad, which should then assume responsibility not only for resuscitation but also for the subsequent delivery.

Failure to deliver with forceps, using moderate traction, should not be regarded with shame. On the other hand, persistent attempts to deliver by brute force constitute bad practice.

Whenever possible the doctor should accompany his case to hospital, giving full particulars of the labour, with special reference to the time of full dilatation, number and type of anaesthetics administered, and the previous obstetrical history. If this is neglected, drowsiness of the patient may lead to the failure to elicit vital information.

In hospital the patient is admitted to a "suspect" ward, as every case must be regarded as potentially infected. (In the present series the incidence of notifiable pyrexia was 18%.) The interests of the individual in such a case demand antibiotics. Unfortunately, however, the routine administration of these drugs may lead to the subsequent production of resistant strains.

It will often be advisable to set up a 5% glucose intravenous drip as soon as possible, in view of the fact that many cases are suffering from acidosis and dehydration. It should also be borne in mind that all of these patients have had some form of anaesthesia, and many have had more than one anaesthetic. It is therefore important to ensure that any further anaesthetic is given by a skilled person, that chloroform is avoided, and that it is the last anaesthetic required. With the latter end in view it is considered advisable after delivery to explore the uterus to discover if any damage has occurred.

Discussion

The fall in the annual number of cases is ascribed to three factors: (1) Improved antenatal care, which has reduced the number of home confinements of such abnormalities as brim disproportion, hydrocephalus, and outlet contraction. (2) The stress laid in the modern teaching of obstetrics on the criteria for successful forceps delivery. (3) The appointment of new consultants in the outlying districts since the advent of the National Health Service in 1948. The number of patients confined in hospital was not a factor in the fall, as there were fewer hospital confinements in the Manchester area in 1951 than in 1945.

Contrary to Freeth's findings, the commonest cause of failure in this series was application of the forceps before the cervix was fully dilated, and in at least 50% of the cases the forceps was applied too soon. Unlike Freeth (1950) earlier reviewers (Feeney, 1947; Stacey, 1931) came

to a similar conclusion. Ovarian tumour, constriction ring, or breech or face presentation were not observed, although Freeth found one of each abnormality.

A maternal mortality of 2% and a foetal loss of 28% are similar to Freeth's figures. In the last 25 cases reviewed the total foetal loss was only 8% and all the mothers survived.

Reference to Table VII demonstrates the progressive improvement in the maternal mortality since 1928. Analysis of the deaths in Miller's series suggests that the reduction

TABLE VII.—Review of Earlier Series

Author	Location	Year	No. of Cases	Maternal Loss %	Foetal Loss %	Minimal Foetal Loss %	No. of Ruptured Uteri
Gadd.	Manchester,	1952	100	2	28	14	2
Freeth	Birmingham,	1950	100	2	34	10	—
Feeney*	Dublin,	1947	77	16.9	60	56	6
Munro	Glasgow,	1933	70	7	51	?	?
Kerr							
Stacey	Sheffield,	1931	154	15	52	29	?
Miller	{ Manchester Glasgow Edinburgh }	1928	558	10	64	23	8

* Does not include any cases in which normal delivery or low forceps with-out complications to the mother occurred.

in maternal loss is due to the advent of antibiotics and blood transfusion rather than to greater obstetrical skill. Miller's deaths occurred from sepsis (37), ruptured uteri (8), post-partum haemorrhage and shock (6), pneumonia (3). Excluding the deaths from sepsis and pneumonia, maternal deaths were only 2.5%, a figure similar to the two recent series in which none of the four deaths occurred from sepsis.

A similar reduction occurred in the total foetal loss. The minimal foetal loss is the percentage of babies dead on admission. Excluding Feeney's series there has been a change for the better in the type of case. In Miller's and Stacey's series the babies dead on admission were over twice as many as in the two later series. Subtracting the minimal foetal loss from the total foetal loss gives the "actual" loss of babies in hospital. In Stacey's series this was 23% and in the present series 14%. This difference may be accounted for by the more confident and safer use of caesarean section to-day for inertia, brim disproportion, and difficult occipito-posterior positions. Caesarean section was employed only for brim disproportion in Freeth's series, with the result that his "actual" foetal loss in hospital was 24%—1% higher than Stacey's figures 20 years previously.

Summary

A review has been undertaken of 100 consecutive failed forceps cases admitted to St. Mary's Hospital, Manchester, during 1943–51.

The incidence of such cases fell from 3.2% to 0.5% of the total emergency admissions, and reasons for this decline are suggested.

The commonest cause of failure was the undilated cervix (39%).

The maternal mortality was 2% and the total foetal loss was 28%.

Pyrexia was notifiable in 18% of the cases.

A comparative survey of earlier series is presented, and reasons are suggested to explain the gradual improvement noted in the results.

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CRISES IN CONGENITAL SPHEROCYTIC ANAEMIA (ACHOLURIC JAUNDICE)

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Since the observation by Owren in 1948 that in the crisis of "acholuric jaundice" the bone marrow showed hypoplasia of the erythron there have been confirmatory reports in America (Dameshek and Bloom, 1948) and on the Continent (Cremers, 1950; Gasser, 1950). Other than an annotation in the *British Medical Journal* (1949) there has been extremely little comment in this country. Whitby and Britton (1950) merely note Owren's views without comment. Changes in the bone marrow as a cause of "crisis" have by no means reached general clinical assent.

Details of the marrow changes in four crises in three children are presented here, and the probable aetiology of the anaemic crisis is discussed.

Case 1

The patient was first admitted to hospital at the age of 1 month with extreme pallor and a history of icterus neonatorum lasting 20 days. Her haemoglobin was 5.2 g.% and she was thought to be a case of congenital hypoplastic anaemia. A blood transfusion was given and she was discharged. When readmitted two months later with further anaemia (Hb 5.6 g.%) her reticulocytes varied between 2.5

FIG. 1.—Case 1. Showing changes in haemoglobin and reticulocyte level during the first crisis. M=marrow biopsy.

and 4% of 2,250,000 red cells. Spherocytes were seen in the film. She was given a further transfusion and discharged.

She attended the out-patient department for about a year, during which her haemoglobin remained around 8 g.% and her reticulocytes between 3 and 6%.

She then had a crisis. This followed a period of restlessness, fretfulness, cough, and nasal discharge for two weeks, during which time she was seen to become increasingly pale. The course of the crisis may be seen in Fig. 1. No reticulocytes were seen for five days; they then appeared, and increased steadily in numbers over the next nine days, her general condition then returning to the pre-crisis state. Marrow biopsies were taken at the onset of the crisis and after recovery. Marrow pictures were based on counts of