It is considered that other functional symptoms, such as bilious vomiting and loss of weight, are likewise the result of the jejunal response to precipitate gastric emptying; in the absence of such emptying, loss of weight is not directly related to the extent of the gastric resection.

A valvular anastomosis for gastric resection is described and its effect in reducing the incidence of functional post-gastrectomy symptoms is shown in a review of the early results in 48 cases.

My thanks are due to the house-surgeons and nurses of Sir Patrick Dun's Hospital for the care which they expended on these patients; to the staff of the x-ray department for the radiological investigations, and to Mrs. J. Henry for the operation sketches.

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THE CAUSE AND MANAGEMENT OF FAILED FORCEPS CASES

BY

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Until 1888 it was not compulsory for a student to attend any case of labour before qualifying, and even now it is necessary for him or her to spend only enough time in a maternity hospital to attend the required number of 20 cases. It is possible to do this without seeing, even less treating, any abnormality; thus the student after qualification only too often enters practice without realizing, other than in theory, the serious difficulties to be encountered.

The comprehensive study of unsuccessful forceps deliveries reveals a wide field of the difficulties encountered in practical obstetrics. The subject therefore is of considerable importance not only to the practising obstetrician but also to the medical student. Indeed, these cases may well have their medico-legal aspect, and it is the operator who must accept full responsibility should legal complications ensue.

A clear appreciation of the dangers and pitfalls arising from the abuse of forceps should be an integral part of undergraduate teaching, and instruction should be directed not only on when to apply forceps but when not to; thus the newly qualified practitioner will benefit from the mistakes of others as well as from his own.

The largest series of cases (558) reported in the literature is that by Miller (1927). This series was discussed by Fletcher Shaw (1928) and Hendry (1928) at the Annual Meeting of the British Medical Association in 1928. Smaller series have been reported by Stacey (1931), Munro Kerr (1937), Feeney (1947), and Dobbie (1948).

For the purposes of this paper the definition of failed forceps may be taken as the unsuccessful application of obstetric forceps in an attempt to effect delivery. In considering the mechanism of this failure, I find that in practice there are two indications of failure: (a) the forceps slip off the presenting part, or (b) they fail to produce descent in spite of traction.

Present Investigation

The case records of 100 patients admitted under the honorary staff of the Birmingham Maternity Hospital during the years 1941-8 have been investigated. The principal causes of failure have been divided into six groups (see Table I). There were 62 forceps deliveries, 17 spontaneous deliveries, 8 internal versions, 6 caesarean sections,

TABLE I.—Details of 100 Cases

Group	Aetiology	No. of Cases	No. of Primiparae	Foetal Deaths	Maternal Deaths
1	Occipito-posterior position	34	28	15	1
2	Deep transverse arrest	22	19	8	—
3	Cervix not fully dilated	20	11	3	—
4	Brim disproportion (normal foetus)	8	4	4	—
5	Contracted outlet (occipito-anterior)	5	4	1	1
6	Miscellaneous:				
	Hydrocephalus	4	2	4	—
	Breech presentation	1	1	—	—
	Face, mento-anterior	1	1	—	—
	Face, mento-posterior	1	1	1	—
	Brow presentation	1	—	1	—
	Contraction ring	1	1	1	—
	Vaginal septum	1	1	—	—
	Ovarian cyst	1	—	—	—
	Total	100	73	38	2

6 craniotomies, and 1 breech extraction. The third stage was normal in all cases, apart from the manual removal of the placenta on two occasions. The cases are analysed in detail, group by group, and observations are made on their management.

Group 1: Persistent Occipito-posterior Position

Method of Delivery in Hospital	No. of Cases	Babies Dead on Admission	Maternal Deaths	Foetal Deaths
Normal	1	—	—	—
Face to pubes	1	—	—	—
Manual rotation (forceps)	26	1	—	9
Internal version	4	1	1	4
Craniotomy	2	2	—	2
Total	34	4	1	15

The one death occurred from post-operative shock; version had been attempted by the patient's own doctor after his failure to deliver with forceps. Craniotomy was attempted after transfer to hospital, but the cranioclast slipped off and a baby weighing 9 lb. 3 oz. (4.2 kg.) was delivered by internal version and breech extraction. In the other three cases internal version was undertaken, after forceps had again failed in hospital, in preference to craniotomy only because the foetal heart could still be heard. Rupture of a uterus already moulded upon the foetus after an unsuccessful attempt at delivery may easily be caused by version, and its use can rarely be justified.

In 26 cases the treatment by manual rotation to the occipito-anterior position followed by the application of forceps resulted in an easy forceps delivery, with one exception. It was the failure to diagnose the posterior position rather than the inability to rotate the head that gave rise to the unsuccessful extraction: the blind application of forceps to the foetal head without first ascertaining its position is done far too often; sooner or later it leads to disaster.

In those cases in which there is some disproportion and the head moulds through the brim, with the occiput posterior, disimpaction of the head is necessary to enable it to be rotated. To do this it must be pushed up above

the brim. Deflexion of the head follows, and it cannot now be pushed down through the brim; thus a high-forceps delivery confronts the operator. When rotating the head in these difficult cases I have found that by placing the left hand firmly above the symphysis pubis, with the palm facing upwards as for the Pawlik grip, displacement of the head above the brim is prevented, flexion of the head is maintained, and a high forceps delivery is avoided.

Some of these cases seem to have been attempts at brim forceps delivery, with disproportion as well as a posterior position, and the high foetal mortality might well have been reduced by lower-segment caesarean section, much as we dislike doing it in the potentially infected case.

Group 2 : Deep Transverse Arrest

Method of Delivery in Hospital	No. of Cases	Babies Dead on Admission	Maternal Deaths	Foetal Deaths
Manual rotation (forceps delivery)	16	1	—	6
Kielland's forceps	4	—	—	—
Craniotomy	2	1	—	2
Total ..	22	2	—	8

Deep transverse arrest of the head was noted as the main cause of failed forceps delivery in an unexpectedly high percentage of cases. In three cases the condition had been recognized and Kielland's forceps had been unsuccessfully applied by the patient's own doctor. I believe, however, that in expert hands these forceps are extremely valuable in deep transverse arrest, as they can be used as a rotator. The foetal mortality in this series supports this view. If Neville's forceps are to be used, everything must be done to place the blades in the coronal diameter of the head. When they are placed over the forehead and occiput in a case of deep transverse arrest the baby is likely to suffer a tentorial tear with an intracranial haemorrhage (Lane-Roberts, 1935).

Group 3 : Cervix Not Fully Dilated

Method of Delivery in Hospital	No. of Cases	Babies Dead on Admission	Maternal Deaths	Foetal Deaths
Normal delivery	10	1	—	2
Low forceps	1	—	—	1
Cervix incised (internal version) ..	9	—	—	—
Total ..	20	1	—	3

The case in which the cervix was incised was that of an eclamptic patient whose doctor had attempted a forceps delivery. Forceps were also unsuccessful when applied in hospital; internal version was performed, the cervix incised, and a live infant extracted weighing 5 lb. 10 oz. (2.6 kg.). This is an example of accouchement forcé, which to-day is no longer employed in the treatment of eclampsia.

In a recent case the total time between the onset of labour and the attempted delivery was three hours; shortly afterwards the patient, a multigravida, had a normal delivery. This shows how even the cervix of a multigravida may prevent delivery when forceps are applied too soon.

In a few cases it seemed that the original application of forceps had been outside the cervix, resulting in severe lacerations. Malpraxis of this sort produces severe maternal shock, the lower uterine segment is torn, and the lateral fornices may be opened up with permanent disability as the sequel.

Group 4 : Brim Disproportion with Normal Foetus

Method of Delivery in Hospital	No. of Cases	Babies Dead on Admission	Maternal Deaths	Foetal Deaths
Lower-segment caesarean section	4	—	—	—
Internal version	1	—	—	1
Craniotomy	2	—	—	2
Walcher's position	1	—	—	1
Total ..	8	—	—	4

One case was interesting in that Walcher's position was tentatively tried for a few pains during which the head descended to mid-cavity. A normal delivery of a baby of 8 lb. 6½ oz. (3.8 kg.) ensued, but it had a fractured parietal bone and died on the second day.

The condition of two of the mothers was regarded as too serious for caesarean section, and, as a high forceps attempt was also unsuccessful in hospital, craniotomy was performed, the baby being sacrificed in the maternal interest (see comment under "Discussion").

In spite of potential infection from the previous manipulations in cases submitted to lower-segment caesarean section there were uniformly good results in mother and child.

Miller in his analysis found that dystocia from brim disproportion accounted for almost one-third of his cases, but Stacey's figure was 13%.

Group 5 : Contracted Outlet (Occipito-anterior Position)

Method of Delivery in Hospital	No. of Cases	Babies Dead on Admission	Maternal Deaths	Foetal Deaths
Difficult forceps delivery ..	5	1	1	1

The death in this series was due to post-operative shock following forceps delivery. In another case of contracted outlet dislocation of the right sacro-iliac joint with disruption of the symphysis pubis occurred during the forceps delivery of a live baby weighing 7 lb. 9½ oz. (3.4 kg.).

This group of cases demonstrates how pelvic outlet contraction can produce a difficult forceps delivery, and consideration must now be given to cases in which delivery cannot be accomplished by forceps alone. It is generally true that the head which passes the pelvic brim will pass through the outlet, but the exception to this dictum is the android type of pelvis with a flat sacrum and prominent ischial spines. If the patient is relatively free from potential infection a lower-segment caesarean section is indicated, but there still remains the group of cases in which infection is deemed present and the child alive and strong. Subcutaneous symphysiotomy or pubiotomy has been reserved for these cases, and fracture of the coccyx may be helpful when this bone is preventing extraction of the head. With a dead child craniotomy is the solution. In one of these cases I had to employ considerable traction to overcome the obstruction.

These cases illustrate the importance of assessing the outlet correctly at the antenatal clinic. Measurement of the intertuberischial diameter with the knuckles is not enough: the angle of the arch, the ischial spines, and the antero-posterior diameter should be carefully assessed. Morris (1947) states that, in all cases in which the antero-posterior diameter from the lower border of the symphysis to the tip of the sacrum is less than 10 cm. (4 in.), the outlet is definitely contracted. Browne (1946) states,

however, that if the transverse diameter is reduced to 8 cm. ($3\frac{1}{4}$ in.) or less the outlet should be regarded as dangerously contracted. X-ray pelvimetry has enabled these diameters to be measured with considerable accuracy, and should be employed to confirm any clinical diagnosis of outlet contraction.

Group 6: Miscellaneous

Case	Method of Delivery in Hospital	No. of Cases	Babies Dead on Admission	Foetal Deaths
Hydrocephalus	Perforation	3	—	3
Breech	Int. version—perf.	1	—	1
Mento-anterior	Extraction	1	—	—
Mento-posterior	Normal delivery	1	—	—
	Manual rotation (forceps)	1	1	1
Brow	Internal version	1	—	1
Contraction ring	Forceps	1	1	1
Vaginal septum	Lower-segment caesarean section	1	—	—
Ovarian cyst	Caesarean hysterectomy	1	—	—
Total		11	2	7

There were no maternal deaths in this group.

Hydrocephalus is not infrequently overlooked in pregnancy, and even during labour it may be mistaken for unruptured membranes or a large caput succedaneum on vaginal examination. The diagnosis in vertex presentations rests on finding a high presenting part, widely separated sutures and fontanelles, and a soft cystic head. I have observed that a fluid "thrill" may sometimes be obtained on bimanual examination, an impulse with two fingers from the right hand in the vagina being transmitted to the left hand holding the head above the symphysis pubis.

Astonishing though it may seem, perusal of previous published series reveals that breech presentation is not an exceptional cause of failed forceps. Most of these cases could have been prevented by adequate antenatal care; they show the importance of a vaginal examination in pregnancy as well as before applying forceps.

Observations on Maternal Mortality and Morbidity

It is to be expected that the maternal mortality and morbidity of this series will have been materially altered by chemotherapy, and such has proved to be the case. The maternal mortality in Miller's and in Stacey's series is 10%, in Munro Kerr's 7.1%, and in Feeney's 16.9%, while in this series it is only 2%. Notifiable cases of puerperal pyrexia amounted to 34%, and a considerable number of these patients were very slow in recovery in spite of chemotherapy; extensive lacerations were the main cause.

There were four cases of third-degree tears with one case of incontinence of faeces, and in another case a vesico-vaginal fistula developed. Scarring of the vaginal vault with laceration of the cervix was a common post-natal finding, but a brighter side of this otherwise dismal picture was that at the post-natal clinic no fewer than 75 patients had no complaints or physical signs attributable to their hazardous labours.

Failed forceps cases are particularly liable to develop prolapse of the uterus. Especially is this so when severe traction has been exerted with the cervix incompletely dilated: a great strain is put upon the uterine supports, particularly Mackenrodt's ligaments, and not infrequently they remain permanently stretched and prolapse follows.

Observation on Foetal Mortality and Morbidity

The foetal mortality rate in Miller's series was 64%, in Stacey's 52%, in Munro Kerr's 47.8%, and in Feeney's 60%, while in my series it was 34%, excluding hydrocephalus. This figure is nevertheless far too high.

The 62 babies that lived can be divided into 32 whose condition was fairly good at birth and 30 whose condition was poor. Five of the latter had facial palsies, two had fractured parietal bones, and a further six had bruises, scalp lacerations, and haematoma; but on eventual discharge from the hospital they were all regarded as satisfactory.

The largest baby weighed 11 lb. 8 oz. (5.2 kg.) and the smallest 5 lb. 10 oz. (2.6 kg.), the average weight for the whole series being 7 lb. 5 oz. (3.3 kg.), which shows it is not necessarily the large baby that gives rise to dystocia. On the other hand, in no less than 29% of the cases the length of gestation was over 42 weeks, suggesting that post-maturity played some part in the aetiology of the unsuccessful forceps delivery. Indeed, it is possible that ossification of the foetal skull bones, preventing moulding of the head, is the most important single factor. It is generally agreed that the post-mature infant does not stand up to a prolonged or difficult labour as well as the normal healthy baby born at term, and this may explain in part the high foetal mortality of this series.

Discussion

It is essential to assess the condition of the mother at once, as a severe degree of maternal distress with heavy acetoneuria and a rapid pulse is frequent. In 33 cases the pulse rate on admission was over 100 and in 12 it was 120. A thorough abdominal examination is most important and often yields valuable information. Malpresentations or hydrocephalus may be found, and in one case an unsuspected twin pregnancy was discovered. The presence or absence of the foetal heart sounds may materially alter the treatment, as craniotomy is generally the best treatment if the baby is dead. A careful vaginal examination should next be made to ascertain the degree of dilatation of the cervix, the presentation, and the cause of the failure of the forceps, and to note any lacerations of the soft parts.

The first decision to be made is whether there is a chance of spontaneous delivery given time, and this decision rests on an accurate diagnosis of the cause of the failure to deliver. Generally the difficulty is not what method to adopt, but when to adopt it in the best interests of the mother and baby. It is sound practice to initiate treatment with anti-shock measures, and an intravenous 10% glucose drip is advisable, as nearly all cases have had chloroform anaesthesia, sometimes of long duration or on two occasions. Calcium gluconate, 10 ml. of a 10% solution, should be given into the drip to protect the liver against chloroform poisoning. The baby stands a second anaesthetic badly, and as repeated anaesthetics increase the foetal and maternal mortality one should suffice for delivery in hospital. Insertion of a self-retaining catheter at the time of a second instrumental delivery is a wise precaution to allow the bladder to regain its tone.

In this series 50% of the cases resulted from the failure of forward rotation of an occipito-posterior position, and 88% of these were in primigravidae. This is in agreement with Claye (1931), who states: "A point seldom stressed in connexion with occipito-posterior cases is that virtually all the trouble occurs in primigravidae. In multigravidae spontaneous delivery is the rule, even if short rotation occurs." Manual rotation had been attempted in some cases, but on applying forceps the head had ascended above the brim and an oblique grip was obtained, with the result that on traction the blades slipped off. A large number of difficult but nevertheless "successful" forceps deliveries of this type must be carried out in practice at the expense of the perineum and resulting in a stillborn or "cerebral" infant.

It would seem that failure of forceps delivery caused by the cervix not being fully dilated arises mainly through the inability to recognize that the cervix must be completely effaced and retracted over the presenting part before forceps may be safely applied in domiciliary midwifery. Occasionally the general anaesthetic given preparatory to the application of forceps causes the head to retract, and examination then reveals a rim of cervix. By mistaking the tight rim of the primigravid cervix four-fifths dilated for the soft dilatable cervix of the multigravida, which is no bar to delivery, the forceps are applied but without delivery of the head.

It was formerly held that caesarean section, even by the lower-segment route, had little or no place in the treatment of failed forceps cases owing to the serious maternal risk from infection. It is now submitted that the results of this series discredit that view, and that the introduction of chemotherapy has revolutionized the treatment of failed forceps cases caused by brim disproportion when the baby is still alive.

In view of the high incidence of puerperal infection it is advisable to begin penicillin therapy immediately in all cases. In spite of chemotherapy the puerperium is often prolonged, with urinary complications much in evidence; and as these cases are potentially infected and therefore a risk to normal patients isolation is recommended.

The case needing forceps delivery when the head is not showing at the vulva is the one that may lead to difficulty. Practitioners who are not experienced obstetricians would be wise to confine themselves to delivering at home only those patients needing a low-forceps delivery.

Summary and Conclusions

The records of 100 cases of failed forceps have been investigated.

Primigravidae comprise almost three-quarters of the patients.

Occipito-posterior positions and deep transverse arrest of the head account for over 50% of the cases; the cervix was not fully dilated in 20%.

Since the introduction of chemotherapy the maternal mortality has been materially lowered, as has the foetal mortality, but to a less extent.

Internal version has little or no place in the treatment of failed forceps delivery.

Brim disproportion should be treated by lower-segment caesarean section; the results from this operation were uniformly good in spite of the previous manipulations.

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USE OF RECTAL THIOPENTONE IN CHILDREN

BY

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Many diagnostic or therapeutic procedures in paediatrics are painful or so unpleasant that the child will not co-operate. This is especially so in the first years of life, when even some painless procedures cannot be performed satisfactorily or without undue loss of time.

The commonest methods of sedation, such as the oral administration of chloral hydrate and of various barbiturates, are both unreliable and insufficient for many purposes. Thomson *et al.* (1949) found that with children over 1 year of age the inhalation of "trilene" gave satisfactory results during minor diagnostic procedures of short duration, such as lumbar puncture or aspiration of the chest. This method is not practical in infants or when access to the face or prolonged sedation is desired. Further, most children dislike the smell of anaesthetic agents and are afraid of a mask over their face.

In paediatric neurological practice complete examination of the fundus oculi and encephalography are procedures for which suitable sedatives are required. For the latter procedure the sedative action should last throughout the injection of the air and the subsequent radiological examination.

Rectal thiopentone has been used as the routine sedative in the streptomycin unit of the department of child health of the University of Sheffield since the beginning of 1949. This method was also used on a few occasions in other departments of the Children's Hospital, Sheffield, during the same period. It is felt worth while to publish the results to date, not because the method is original but because its value is not generally known.

The use of thiopentone by the rectal route was described by Weinstein (1939), Hooper (1942), and Weinstein and Light (1943). The last-named authors used the method in 1,500 cases, some 50 of them being children. They adopted a dosage scheme of 1 g. per 50 lb. (22.7 kg.) of body weight, and used thiopentone as a basal anaesthetic before inhalation anaesthesia or spinal analgesia. They were satisfied with its therapeutic action and noted no toxic effects. Burnap *et al.* (1948) reported similar findings in 300 children, and noted the absence of complications even after repeated administrations. Hunter (1943) used smaller doses (0.75 g. per 50 lb.), but his results in a small series were not so consistently satisfactory.

Material and Method

The results of 113 consecutive rectal administrations of thiopentone to 64 children between the ages of 3 months and 12 years are reported. Eleven were under 1 year of age. Fifty-six of the children were suffering from some form of tuberculosis, mostly meningitis and miliary tuberculosis; the other eight suffered from various neurological disorders. The examinations were usually carried out shortly after admission, when many of the children were extremely ill, and were often repeated on two to six occasions.

The indications for rectal thiopentone sedation were examination of the fundus oculi on 54 occasions, encephalography on 47, and other procedures (cystoscopy, laryngoscopy, etc.) on 12.