REFERENCES

- Anderson, I. M., and Coles, H. M. T. (1955). *Thorax*, **10**, 338.
 Bailey, C. P., Nichols, H. T., Bolton, H. E., Jamison, W. L., and Gomez-Almeida, M. (1954). *Ann. Surg.*, **140**, 805.
 Blount, S. G., jun., Balchum, O. J., and Gensini, G. (1956). *Circulation*, **13**, 499.
 Campbell, M., and Missen, G. A. K. (1957). *Brit. Heart J.*, **19**, 403.
 Drew, C. E., and Anderson, I. M. (1959). *Lancet*, **1**, 748.
 — Keen, G., and Benazon, D. B. (1959). *Ibid.*, **1**, 745.
 Keith, J. D., Rowe, R. D., and Vlad, P. (1958). *Heart Disease in Infancy and Childhood*. Macmillan, New York.
 Kiely, B., Adams, J., jun., Anderson, R. C., and Lester, R. G. (1958). *J. Dis. Child.*, **96**, 381.
 Kramer, T. C. (1942). *Amer. J. Anat.*, **71**, 343.
 McGoon, D. C., Swan, H. J. C., Brandenburg, R. O., Connolly, D. C., and Kirklin, J. W. (1959). *Circulation*, **19**, 195.
 Paul, M. H. (1958). *Pediat. Clin. N. Amer.*, **5**, 1011.
 Toscano-Barbosa, E., Brandenburg, R. O., and Burchell, H. B. (1956). *Proc. Mayo Clin.*, **31**, 513.
 Wakai, C. S., and Edwards, J. E. (1956). *Ibid.*, **31**, 487.
 — (1958). *Amer. Heart J.*, **56**, 779.
 — Swan, H. J. C., and Wood, E. H. (1956). *Proc. Mayo Clin.*, **31**, 500.
 Watkins, E., jun., and Gross, R. E. (1955). *J. thorac. Surg.*, **30**, 469.
 Wood, P. (1956). *Diseases of the Heart and Circulation*, 2nd revised edition. Eyre and Spottiswoode, London.

MANAGEMENT OF CASES OF ABORTION

BY

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This review is based on the work of the abortion unit at Walton Hospital, Liverpool, during the years 1958 and 1959, and the results achieved with a particular type of treatment in cases of abortion admitted to it.

Cases of abortion are usually admitted to a gynaecological ward, a system which is very inconvenient when large numbers are admitted annually. Among its disadvantages is the blocking of a variable number of beds, making the arrangements of clinic admissions difficult, and there is also the frequent use of an operating theatre at inconvenient times.

In January, 1950, at this hospital, a separate ward block with 40 beds was made available as an abortion unit. It is arranged in three floors, with an operating theatre on the first floor. Patients admitted with a diagnosis of abortion are taken to the abortion unit unless they require resuscitation in the admission room.

Criteria Used in Classification

An abortion was regarded as threatened if the cervix was closed and the bleeding slight. In inevitable abortion the cervix must be open with the products of conception protruding and felt digitally or seen by direct vision. No abortion was regarded as complete unless the intact ovum or the foetus followed by an intact placenta was seen by the hospital medical officer.

Difficulty often arose in differentiating between threatened, incomplete, and complete abortion. The amount of bleeding was not a reliable guide; in some cases the pregnancy continued after relatively heavy bleeding, while in others a slight loss of blood may have been followed by the unrecognized expulsion of an intact ovum. When comparison of the period of amenorrhoea with the size of the uterus, the state of the cervix, and examination of the vaginal discharge for fragments of

ovum still left the diagnosis in doubt, the abortion was regarded as threatened. Biological pregnancy tests and a period of observation helped to establish the diagnosis later.

The criteria for the diagnosis of septic abortion were similar to those adopted by Stallworthy (1948)—namely, that an abortion was regarded as septic when associated with pyrexia for which no other cause was found, with offensive purulent discharge, or with evidence of pelvic infection.

Treatment

Cases are admitted to the ground-floor wards and a vaginal examination is made. If the abortion is inevitable the part of the ovum in the cervical canal is removed either digitally or, if this is impossible, with a pair of sponge forceps under direct vision. Ergometrine 1 mg. is given intramuscularly. Cases of incomplete abortion are also given ergometrine if there is any bleeding.

Each week, operating sessions are held on Tuesday, Thursday, and Saturday mornings. The day before operation all cases in which surgical evacuation of the uterus is to be performed are taken to the first-floor ward. They include all the incomplete abortions and any "complete" abortions where vaginal bleeding or discharge persists.

Morphine sulphate 1/6 gr. (11 mg.) and atropine sulphate 1/100 gr. (0.65 mg.) are given intramuscularly as premedication one hour before operation. Thio-pentone alone is used in most cases, nitrous oxide and oxygen being used occasionally for supplementary maintenance of anaesthesia. Vulval toilet is carried out, using 1% cetrimide solution. Retained products of conception are removed digitally or by sponge forceps, and curettage is performed with a large, sharp curette. If bleeding is troublesome ergometrine 1 mg. is given intravenously. Packs are not left in the uterus and intrauterine douches are not used.

The patient is moved to the second floor on the day after operation, and if her progress is satisfactory she is discharged on the fourth day after operation.

This scheme of treatment has been in operation for nine years and the results have been very satisfactory.

The Investigation

It is estimated that about 15 to 20% of pregnancies terminate in abortion, and during the two-year period, January, 1958, to December, 1959, 2,387 patients were admitted to the abortion unit (Table I). The district from which these patients are drawn is a large over-crowded area adjacent to the docks of Liverpool. The general standard of health and hygiene is low and anaemia is common.

TABLE I.—Admissions During 1958 and 1959

Total no. of admissions	2,387
No. booked (at hospital antenatal clinic)	204
No. not booked	2,183
Average age	28.9 years
Primigravidae	24.8%
Unmarried	5.1%
Average maturity at onset of abortion	11.7 weeks
Less than 16 weeks' gestation	87%
Prophylactic rest (habitual abortions)	56
Hydatidiform moles	3
Ectopic gestation	1

The average age of the patients was 28.9 years, the youngest being 15 and the oldest 54. This corresponds with other series in the literature; in 2,665 cases quoted by Davis (1950) it was 29 years. As he points out,

this relatively high average age is due to the greater incidence of abortion in married women. The percentage of single patients varies according to the type of district and, as in the present series, is low in the working-class area with its low average age of marriage. The average maturity of 11.7 weeks at onset of the abortion agrees with Davis's figure of 12 weeks.

TABLE II.—*Type and Treatment of 2,327 Cases*

Diagnosis on Admission	No. of Cases Admitted	Completed Spontaneously	Completed Surgically	Pregnancy Continued
Threatened ..	643	27	149	467
Inevitable ..	195	14	181	
Incomplete ..	1,255		1,255	
Septic ..	149		149	
Missed ..	85		85	

Excluding prophylactic rest cases and miscellaneous ones.

In 62% of admissions the abortion was diagnosed as inevitable or incomplete, and nearly all of them had a surgical evacuation of the uterus. This figure is an indication of the "interventionist" type of treatment carried out in this unit. The 41 cases which aborted completely, not necessitating curettage, were mostly in the 24 to 28 weeks' period of gestation. In these the foetus and placenta were verified as being completely evacuated by a medical officer. We are in agreement with Safford and Longworth (1950), who made a special comment on the number of cases "ordinarily considered complete" which were, in reality, examples of incomplete abortion; retained chorionic villi being found in over 50% of all cases when the material removed from the uterus was later examined.

A diagnosis of threatened abortion was made in 643 patients, and 467 (72%) of these pregnancies continued. Treatment consisted of phenobarbitone alone, apart from bed rest. Although favourable results have been reported by Bishop (1951) and by Koff and Tulsky (1953) from the use of large doses of progesterone, the impression has been gained that the enthusiastic claims for the efficacy of progesterone, oestrogen, and vitamin E preparations in preserving pregnancy are not justified. Bevis (1951) had excellent results with rest and reassurance alone.

Colvin (1950), in a statistical study of the salvage possibilities in 1,570 consecutive cases of threatened abortion, states: "Mother nature efficiently copes with the problem of threatened abortion by preserving 69.9% of normal conceptions, and efficiently detects and successfully rids the uterus of 24.1% of pregnancies in which foetal development is defective."

The number of cases of prolonged intermittent painless bleeding during the middle trimester due to placenta praevia is impressive. Spontaneous expulsion occurs in many cases, but abdominal hysterotomy was resorted to in three cases owing to the severity of the bleeding.

For a long time there have been two schools of thought regarding the treatment of abortion once it has become inevitable or incomplete—the "interventionists" and the "non-interventionists." Series of cases have been published to show that one or the other is the safer method of treatment. Studdiford (1950) compared the two in a series of 4,129 patients and concluded that the results of the methods were not appreciably different. Nowadays the argument against intervention has lost its point, for the management of these patients has been revolutionized by the introduction of antibiotic drugs and an efficient blood transfusion service. These

advances have greatly reduced the dangers of the two major causes of mortality in abortion—sepsis and haemorrhage.

Important from the point of view of hospital administration is the fact that for patients treated surgically the average length of stay in hospital has been much reduced.

In this unit, apart from the few cases where bleeding is so heavy as to require immediate operation, the time at which surgical intervention is practised varies according to the time at which the patient is admitted and the next operating day. It may be anything from about one hour to a maximum of three days. It is certainly more convenient and economical, where large numbers of patients are concerned, to have all the operations collected at three set sessions than to take each case individually to the theatre at any hour of the day or night.

Experience at this unit confirms that of Stallworthy (1948) and has shown that most cases bleeding heavily on admission have some part of the ovum lying in the cervical canal, and that, if the cervical canal is cleared at once and ergometrine given, the bleeding will cease. The patient may then be safely left as a case of incomplete abortion until the next operation list. It is rare for further bleeding to occur during this period. If a patient is bleeding severely on admission, and this treatment fails to arrest it, blood transfusion and oxytocics are followed by immediate surgical evacuation of the uterus.

The patient who has passed a foetus at 16–28 weeks' maturity and still has a placenta *in utero* often presents a problem. It has been our experience that an exploratory vaginal examination, with a finger introduced into the uterus, provoked heavy bleeding in so many cases that it has been banned. So long as the patient is not bleeding it is best to wait for the placenta to be expelled spontaneously. If there is any bleeding, or if the placenta is retained more than a few hours, the patient is taken to the theatre and a manual removal is carried out under anaesthesia.

TABLE III.—*Emergency Operations and Blood Transfusions*

Operations immediately after admission ..	27
Blood transfusions ..	270
Transfusions as emergency resuscitative measures ..	59
.. for rapid treatment of anaemia ..	211

The number of operations performed immediately after admission was only 27 (Table III), and this is due largely to the practice of emptying the cervix in inevitable abortions. Blood transfusions were given in 11.6% of cases, and, of these, 22% were given as a resuscitation measure and 78% as a rapid treatment of anaemia. The value of blood transfusions is inestimable. A pint or two of blood is a relatively safe and more efficient method of correcting the anaemia and raising the general resistance to overcome infection than oral or parenteral iron therapy alone, which is meted out to patients almost as a routine during their stay in hospital and on discharge home. In a series of 600 cases Corston and Stallworthy (1947) gave 71 blood transfusions, an incidence of 11.8%.

The value of dextran and other plasma substitutes has perhaps been overrated. Scott (1955) has attributed coagulation failure to the effects of dextran administration. It is suggested that, quite apart from the factor of fibrinogen dilution by intravenous dextran, the fibrinogen may be precipitated as fibrin or inactivated

by forming a fibrinogen-dextran compound. We have had trouble after dextran infusion, and have now ceased to use it altogether. The risk of hepatitis with small-pool plasma is negligible, and the marked improvement in the shocked patient with its use will in most cases provide the time necessary to group the patient and cross-match a bottle of blood. Often the general condition has so improved that blood transfusion is not required.

Surgical Evacuation of the Uterus

The cervix is usually patulous, but if dilatation is necessary it is carried out with Hegar's dilators until a sponge forceps can be introduced. In this unit a large, sharp curette at least $\frac{1}{2}$ in. (1.3 cm.) in diameter at its widest part is always used. A blunt curette needs quite heavy pressure to remove any but the least adherent tissue, whereas a sharp curette requires less pressure and is therefore safer than the blunt instruments. In the present series there were no cases of perforation of the uterus.

We in this unit agree with Purdie (1947) that intra-uterine packs are unnecessary and dangerous. Packs do not always control bleeding, and when left in for several hours they encourage infection by preventing free drainage. Further, we have never found the necessity for warm intrauterine douches to control bleeding. Thorough evacuation of the uterus reduces the number of patients readmitted with menstrual disturbances or persistent bleeding.

TABLE IV.—Septic Abortions

Temperature 106° F. (37.8° C.) or over	..	..	149 (6.4%)
Gas-gangrene	..	..	1
Severe pelvic infection	..	..	11 (0.5%)

In the present series 6.4% of patients had at some time after admission a temperature of over 100° F. (37.8° C.) (Table IV). The incidence is rather low, as Burnett (1952) found an incidence of 11.5%, Studdiford (1950) reported 38%, and Bishop (1948) reported 17.3% as being septic in nature in their series. The discrepancy between these figures and ours is undoubtedly due to the prompt administration of antibiotics in suspected cases.

It is notoriously difficult to obtain reliable histories from patients suffering from septic abortion, and it is often suspected that criminal interference, which the patient will not acknowledge, has taken place. Davis (1950) thought that the great majority (perhaps 90%) of all abortions were induced in one way or another. The Inter-departmental Committee on Abortion (1939) came to the conclusion that 40% of the abortions in this country may be due to illegal interference.

Identification of the infecting organism has been possible in most cases, although even in clinically severe infection, surprisingly enough, no growth could be obtained from culture of high vaginal swabs. We agree with Burnett that owing to this lack of bacteriological aid empirical antibiotic treatment should be begun before the results of culture become available. We give a combination of penicillin and streptomycin therapy in full dosage in all cases until the culture report is available. The full course, usually of five days, is given, and the treatment is not allowed to lapse because the pyrexia has settled after the first day. The broad-spectrum antibiotics are kept in reserve for use after antibiotic-sensitivity tests have been carried out.

During the past nine years there were five cases of *Clostridium welchii* infection, all clinically typical, and

three were proved bacteriologically. They were treated with full-dosage penicillin and anti-gas-gangrene serum, and four recovered. Dawbarn and Williams (1938) described three similar cases from this hospital; all were fatal. Comparison with the recent cases shows that the only difference in treatment was the use of antibiotics in the present series.

There were 11 cases of severe pelvic infection after abortion, an incidence of 0.5%. These were variously diagnosed as salpingitis, parametritis, and pelvic peritonitis. There were no cases of general peritonitis or pelvic abscess. They all responded to chemotherapy and all recovered. The incidence of similar infection in Davis's series was 4.6%, this being due to the series having extended for over 15 years and most of the cases having been treated before the antibiotic era.

The argument of active versus passive treatment of septic abortion has brought endless but inconclusive controversy. Taussig (1936) endorsed the view that expectant treatment was safer, but the more recent figures of Corston and Stallworthy (1947), Purdie (1947), and Studdiford (1950) indicate that immediate evacuation is apparently as safe. Our own experience confirms the latter finding. Although operative evacuation of an infected uterus is a delicate and highly dangerous procedure, the advantages are considerable. The infecting agent is removed, the abortion is properly completed, and the period of convalescence is materially shortened. Furthermore, the employment of intravenous ergometrine during the procedure has reduced the risk of perforation and of gross haemorrhage, and made evacuation so much the safer. Our contention is that the risk of generalized spread of the infection as a sequel to intervention is minimized by adopting the procedure of evacuation of the uterus after preliminary saturation of the blood with antibiotics. We hope that the results will justify our claim.

In over 90% of septic abortions there is no evidence of spread of infection beyond the uterus. Burnett (1952) showed that the surgical evacuation was best performed 24 hours after the temperature and pulse had returned to normal. We, however, have had no hesitation in carrying out curettage as soon as possible. This was carried out regardless of the infecting organism, provided the patient had received adequate antibiotic cover prior to the procedure for 24 to 36 hours after admission. When subsequent examination showed the development of a spreading infection, surgical evacuation of the uterus was deferred.

Excessive haemorrhage was regarded as the only reason for immediate operative intervention in the presence of pyrexia. Removal by sponge forceps or finger of loose products of conception protruding through the canal has enabled definitive evacuation under anaesthesia to be undertaken at a routine operating session after antibiotic therapy. Immediate transfusion has been found necessary in many of these patients.

In most cases the fever is due to an acute endometritis secondary to the presence of necrotic retained products, as in the vast majority of instances the temperature falls to normal within 24 hours after the operative completion of the abortion, while in a few this takes place gradually over a period of two to three days.

In the severe cases where the infection has spread beyond the uterus, except for removal of loose and easily

accessible products of conception in the cervical canal, surgical evacuation is postponed until the spreading process has been brought under control with antibiotic therapy. Fortunately, continued excessive blood loss is rarely encountered in such patients. When it is, immediate curettage is carried out by necessity.

Missed Abortion

Once a diagnosis of missed abortion is confirmed we favour active treatment. A policy of watchful expectancy has many disadvantages. In addition to the inconvenience and mental distress caused to the patient by waiting, the association of hypofibrinogenaemia with prolonged retention of a dead foetus *in utero* (Barry *et al.*, 1955; Quinn and Harper, 1955) would appear to be a strong argument in favour of active treatment.

Over the years we have used medical induction as suggested by Jeffcoate (1940), employing oestrogens followed by "pitocin," but have not been impressed with the results. Martin and Menzies (1955), in a critical re-evaluation of the role of oestrogen therapy, found it of very little value. We have therefore used intravenous pitocin drips in a concentration of 5 units per pint (570 ml.) of glucose solution, but have not been impressed by the reliability of this procedure. Loudon (1959) has described the treatment of missed abortion with pitocin intravenous drips in high concentration, and claimed good results. We, too, have since employed this method with success in five cases of missed abortion occurring after the fourteenth week of gestation, and endorse Loudon's claim that this technique offers a reliable, rapid, and safe method of managing missed abortion.

TABLE V.—*Stay in Hospital*

Average stay of patients with threatened abortion ..	15.1 days
" " " " completed abortion ..	6.9 "

Patients are discharged on the fourth day after operation. Corston and Stallworthy also discharged their patients at about the same time, and their average stay in 600 cases was 7.5 days. The figure for threatened abortions is raised in this unit owing to the increasing number of patients with habitual abortion being admitted for prophylactic rest. On the other hand, the average stay of patients with completed abortion has been reduced owing to the quicker turnover of the cases as they come in, coupled with energetic treatment of long-standing anaemia with blood transfusions.

Mortality

Since the inception of this unit five patients have died, giving a total abortion mortality rate of 0.06%. The

TABLE VI.—*Mortality Rates*

Author	Years	No. of Abortions	No. of Deaths	Mortality Rate
FitzGibbon (1947)	1919-26	1,952	6	0.31%
Davis (1950) ..	1935-50	2,665	6	0.26%
Ramsay (1948) ..	1937-46	1,430 (septic)	47	3.29%
Stallworthy (1948)	1939-48	803	2	0.12%
Studdiford (1950)	1940-49	4,129	17	1.08%
Bishop (1948) ..	1942-47	2,317	10	0.43%
Purdie (1947) ..	1945	481	2	0.42%
Burnett (1952) ..	1946-50	2,322	4	0.09%
Walton series ..	1951-59	8,347	5	0.06%

mortality rates reported by various observers in recent years are shown in Table VI.

The one death in the present series occurred as follows. The patient was admitted at the twentieth week

of her pregnancy. Seven weeks later hysterotomy was carried out because of persistent blood loss. A placenta praevia was noted at operation, and death occurred from uncontrollable haemorrhage due to failure of coagulation. In retrospect, we feel that this death could have been averted if plasma and not dextran had been used.

Conclusion

The three aims in the management of abortion are to save as many pregnancies as possible, reduce mortality and morbidity, and shorten the stay in hospital. Although in recent years there has been a striking reduction in the number of women who died as a result of abortion, as shown by the Registrar-General's figures for England and Wales, yet deaths from abortion still rank third highest on the list of deaths from maternal causes (Ministry of Health, 1960). Many of these deaths were preventable. In this respect we wish to make a plea for the greater use of the "flying squad" and adequate provision of hospital beds.

Jones *et al.*, quoting the Emergency Bed Service Report, said that the problem of admitting cases of abortion to hospital was second only to that of the chronic sick (*Lancet*, 1951). In a memorandum on the admission of abortions submitted to the North-West Metropolitan Regional Hospital Board, they proposed that each hospital management committee area should set up special gynaecological centres to which abortions could be sent.

Since the establishment of this unit, abortions are admitted from a wider district than that normally served by the hospital. Their admission is no problem and is not resented, since they do not interfere with the gynaecological ward. Over the years the treatment has evolved into a routine which is convenient and, we believe, efficient.

Summary

2,327 cases of abortion admitted to an abortion unit over a two-year period are reviewed and the results achieved with a particular type of treatment analysed.

62% of these abortions were inevitable or incomplete at the time of admission, and the reasons for the "interventionist" type of treatment adopted are set out.

Favourable results were achieved with bed rest and sedation in cases of threatened abortion.

The value of plasma and blood transfusions and the dangers of dextran administration are discussed.

Active and passive treatment are placed in their proper perspective in regard to septic abortions, having due regard to the availability of modern ancillary measures.

The problem of missed abortions is reviewed. It is suggested that pitocin drips in high concentration should prove satisfactory.

The low mortality rate of 0.06% was achieved by a set plan of management. It also reflects the part played by an efficient blood transfusion service and antibiotics.

However, mortality figures for abortions in general leave no place for complacency. It is suggested that greater use of the "flying squad," provision of more hospital beds, and establishment of special centres would help in great measure to reduce the mortality and subsequent morbidity associated with abortions.

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REFERENCES

- Barry, A. P., Geohegan, F., and Shea, S. M. (1955). *Brit. med. J.*, **2**, 287.
- Bevis, D. C. A. (1951). *Lancet*, **2**, 207.
- Bishop, I. R. (1948). *Proc. roy. Soc. Med.*, **41**, 318.
- Bishop, P. M. F. (1951). *Gynaecological Endocrinology for the Practitioner*, 2nd ed. Livingstone, Edinburgh.
- Burnett, C. W. F. (1952). *Brit. med. J.*, **1**, 886.
- Colvin, E. D. (1950). In *Progress in Gynecology*, edited by J. V. Meigs and S. H. Sturgis, **2**, 362. Heinemann, London.
- Corston, J. McD., and Stallworthy, J. (1947). *Brit. med. J.*, **2**, 89.
- Davis, A. (1950). *Ibid.*, **2**, 123.
- Dawbarn, R. Y., and Williams, B. (1938). *Ibid.*, **2**, 279.
- FitzGibbon, G. (1947). *J. Obstet. Gynaec. Brit. Emp.*, **54**, 838.
- Inter-departmental Committee on Abortion (1939). Report. H.M.S.O., London.
- Jeffcoate, T. N. A. (1940). *Lancet*, **1**, 1045.
- Koff, A. K., and Tulskey, A. S. (1953). *Surg. Clin. N. Amer.*, **33**, 3.
- Lancet*, 1951, **2**, 394.
- Loudon, J. D. O. (1959). *J. Obstet. Gynaec. Brit. Emp.*, **66**, 277.
- Martin, R. H., and Menzies, D. N. (1955). *Ibid.*, **62**, 256.
- Ministry of Health (1960). *Report on Confidential Enquiries into Maternal Deaths in England and Wales, 1955-1957*. H.M.S.O., London.
- Purdie, A. W. (1947). *Brit. med. J.*, **2**, 272.
- Quinn, L. J., and Harper, J. A. (1955). *J. Obstet. Gynaec. Brit. Emp.*, **62**, 280.
- Ramsay, A. M. (1948). *Proc. roy. Soc. Med.*, **41**, 317.
- Safford, H. B., and Longworth, E. F. (1950). *Amer. J. Obstet. Gynec.*, **59**, 398.
- Scott, J. S. (1955). *Brit. med. J.*, **2**, 290.
- Stallworthy, J. (1948). *Proc. roy. Soc. Med.*, **41**, 321.
- Studdiford, W. E. (1950). In *Progress in Gynecology*, edited by J. V. Meigs and S. H. Sturgis, **2**, 437. Heinemann, London.
- Taussig, F. J. (1936). *Abortion, Spontaneous and Induced*, p. 26. Kimpton, London.

INTRANASAL USE OF SYNTHETIC OXYTOCIN IN MANAGEMENT OF BREAST-FEEDING

BY

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The role of oxytocin in the initiation and maintenance of lactation is now well established (Petersen, 1944; Cross, 1955; Berde, 1959). It has been used clinically as a means of inducing milk ejection for some time (Newton and Newton, 1948, 1951). Soon after oxytocin had been synthesized by du Vigneaud *et al.* (1953) it was shown that synthetic oxytocin exerted the same effect on the myoepithelial cells of the mammary gland as the naturally occurring hormone (Nickerson *et al.*, 1954; Berde and Cerletti, 1957; Beller *et al.*, 1958). Oral and nasal applications of the posterior pituitary hormones have been used for many years (Donaldson, 1921; Hofbauer *et al.*, 1927).

Recently several papers have appeared concerning the intranasal use of synthetic oxytocin. Berde and Cerletti (1960) have compared the effects of administering oxytocin by the intravenous, intramuscular, and intranasal routes on the lactating mammary gland of the rabbit. Newton and Egli (1958) studied the effect of intranasal oxytocin in lactating women. Baumgarten and Hofhansl (1959) and Baumgarten and Watzek (1959) showed that the intranasal administration of oxytocin induced ejection of milk within 70 seconds of inhaling five international units, and also that it was effective in relieving engorgement of the breasts. Hollenbach (1959), Stewart and Nelson (1959), and Wenner (1959) have all used the spray with good effect

in the management of breast-feeding. Hendricks and Gabel (1960) have used intranasal oxytocin for the induction of labour.

This report of a double-blind trial is the first to appear in this country concerning the intranasal use of synthetic oxytocin in the management of breast-feeding.

Plan of the Trial

Primigravidae with normally protractile nipples, who had been delivered spontaneously of normal healthy infants, were selected for the trial. No twin pregnancies were included. The selection of patients was designed to exclude variables which might otherwise have occurred as the result of difficulty in establishing breast-feeding because of poor nipples or because the mother or the baby was ill. Fifty patients were issued with a nasal spray, which contained either synthetic oxytocin ("syntocinon") or an inert placebo solution with the same physical characteristics. The solutions were contained in small bottles at a pressure of one atmosphere and they were stored at 4° C. After inserting the nozzle of the spray into one nostril and occluding the other, it was operated by depressing the wings of the nozzle so that a fine spray of the contained solution could be inhaled. The active sprays contained approximately 5 ml. of a solution of oxytocin at a concentration of 40 I.U./ml. By depressing the nozzle while counting "one" and inhaling once the patient inhaled 4-5 I.U. of synthetic oxytocin.

Twenty-five sprays containing synthetic oxytocin and 25 containing the placebo were randomly issued to the selected patients, so that the contents of each bottle were unknown both to the patients and to the observer. The patients were instructed to inhale once from the spray about two to five minutes before starting each feed; treatment began with the first feed on the second day after delivery and continued until the contents of the bottle were exhausted.

Infants were put to the breast at three-hourly intervals for the first 48 hours after delivery; thereafter, in most cases, the time between feeds was extended to four-hourly intervals. Routine expression of the breasts, either before or after feeding, was not practised. Oestrogens were not given routinely, but only to patients who developed early engorgement of the breasts; in these cases 5 mg. of stilboestrol was given by mouth, and this dose was repeated if necessary.

Results

The results of treatment were evaluated by assessing the incidence of breast engorgement in the two groups, as judged by clinical observation and the necessity for the use of either oestrogens and/or analgesics. Two types of breast engorgement were distinguished, early (vascular) and late (milk) (Douglas *et al.*, 1957). These are distinct entities, the discomfort experienced by the patient is much the same, but the time of onset, cause, and treatment are vastly different. Engorgement was assessed arbitrarily. I examined the breasts each day and awarded a score for the degree of engorgement observed—that is, 0, +, ++, +++, +++++. In addition, the maximum loss of weight, the amount of weight gained since birth and the day of discharge or the tenth day after delivery (whichever was earlier), and the average size of feeds measured by test-weighing on the seventh day were recorded for each baby in the series.