abnormal constituents were present except acetone on the second day.

On the seventh day after admission the child smiled, took an active interest in his surroundings, and accepted a semi-solid diet. Convalescence was uneventful, and he was discharged after 17 days in hospital. Review at intervals during the next month revealed no abnormality, though his mother stated that he was fretful and irritable at home. Tests for bromate in the urine on the third day were negative.

Discussion

Goodman and Gilman (1941) state that bromides depress the activity of the nervous system but have little effect on the kidneys or other tissues. However, bromates which do not release the ionic form do not possess the actions of the ionizable bromide salts. Bromates are only partly reduced in the tissues, and, according to Santesson and Wickberg (1913), are toxic to animals, producing among other features apathy, vomiting, diarrhoea, and depression of the central nervous system, particularly the respiratory centre. These workers also noted conspicuous changes in the kidneys, especially tubular degeneration. Some of these features were noted in our patient.

The toxic effects in the patient described by Dunskey (1947) were similar to those in this boy, but his patient developed anuria, which persisted with convulsions until death. Necropsy revealed gross tubular damage in the kidneys. Other findings were hepatitis, pulmonary oedema, and toxic myocarditis.

It is estimated that this boy swallowed 60 gr. (4 g.) of potassium bromate, but no evidence is available of the amount consumed in the other cases.

We asked the manufacturers of the home hair-waving outfit for information about recommended methods of treating poisoning caused by accidental swallowing of neutralizing solution, and they obtained the following guide from their New York headquarters:—(1) Emetic: (a) teaspoonful of mustard powder in glassful of warm water, or (b) zinc sulphate, half teaspoonful in warm water followed by copious drinks of water, or (c) apomorphine, 5 mg. intramuscularly, and/or (d) wash out the stomach with stomach tube. (2) Sodium thiosulphate (hypo)—one level teaspoonful in water. This may precede but should follow the emetic. (3) Demulcent drinks such as milk, flour and water, or cereal gruel. (4) If shock is present, treat for shock, but avoid central nervous stimulants. (5) For pain (gastritis) give morphine, 15 mg. subcutaneously. Dose for children 5 mg. or more, depending on age and weight. (6) Sodium thiosulphate solution 1% intravenously by drip, 100 to 500 ml. If not feasible, give 10 to 50 ml. of a 10% solution.

Investigation in this hospital has shown that, after incubation of normal gastric juice at 38° C. with potassium bromate for periods of up to three days, no bromide or bromine was released. Bromine was not liberated in acid solution unless the pH was below 1. This agrees with other experimental evidence that bromate is absorbed unchanged. The bromate used by the manufacturers of the home-perm sets showed no evidence of bromide contamination.

In the presence of dilute HCl and thiosulphate some bromate is reduced to bromide, but in addition there is some reduction of thiosulphate to sulphide, which is in itself a powerful irritant and toxic agent. For this reason oral administration of thiosulphate is not advised.

We would criticize the use of apomorphine, as vomiting is severe in established cases, and suggest that stimulants such as nikethamide may be required when the respiratory centre is depressed. Fluids should be given if necessary intravenously when vomiting is protracted.

Immediate evacuation of stomach contents and gastric lavage with normal saline are of the utmost value, as we have information that when small quantities have been consumed and an emetic was given speedily no toxicity was observed.

Summary

The patient here described was a child of 3 years who had swallowed about a quarter of a pint of a solution of potassium bromate—60 gr. (4 g.)—used as a neutralizer in a "home-perm" outfit. The child was very ill for some days, but was discharged from hospital completely recovered 17 days after admission. Emergency treatment should include emptying of the stomach and gastric lavage with normal saline.

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PREGNANCY PROLONGED BEYOND THE EXPECTED DATE

BY

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The term "post-maturity" has purposely been avoided in the title of this article, as it implies that this state is pathological.

It is generally agreed that the baby born at term (after 40 weeks' gestation) has the best chance of survival. It is also generally supposed that with post-mature babies, as with premature babies, there is an increased mortality. To many people, therefore, it seems that labour should be induced as soon as the pregnancy becomes post-mature; and there is evidence of a growing tendency for such induction to be performed by many obstetricians. Mills (1950) states that he induces labour in all cases in which pregnancy goes ten days beyond the expected date of delivery. Malpas (1950) says that he advises induction if the patient goes three days beyond the expected date of delivery. That these policies are not always justifiable will be obvious from the following considerations.

The duration of pregnancy varies considerably in humans, and, as in all biological measurement, there is an expected variation on each side of the "mean." With regard to the size of the baby, there is also variation: it is stated in standard textbooks that a baby at term may weigh anything from 5 to 10 lb. (2.3 to 4.5 kg.). It is also known that in women with long menstrual cycles pregnancy tends to become post-mature. For these reasons alone a cut-and-dried policy of routine induction at ten days, or at any other precise period after the

expected date of delivery, is difficult to uphold; by such fixed methods some of the art of obstetrics is inevitably lost.

Gibson and McKeown (1950), in Birmingham, found that 31.72% of women in their series of 17,072 cases went seven days beyond the expected date of delivery. If, therefore, obstetricians were to induce labour in all cases in which pregnancy goes seven days beyond the expected date the induction rate would be as high as 31.72% for post-maturity alone, which would amount to 250,000 inductions annually in this country.

Another reason for the increased tendency to perform surgical induction of labour is that the operation now carries a very low mortality or morbidity, especially when performed under a penicillin or chemotherapy shield. But, although low, the mortality and morbidity directly or indirectly attributable to this procedure is by no means negligible. It therefore seems fair to state that the decision for or against induction of labour should rest on something more substantial than an estimate of the duration of pregnancy as judged by the reported date of the patient's last menstrual period.

Aetiology of Post-maturity

Because the cause of the onset of labour is unknown—although doubtless influenced by the convergence of structural, hormonal, nervous, circulatory, and nutritional factors—the aetiology of post-maturity is also obscure. The following factors must, however, be regarded as of importance.

Heredity.—There seems to be a hereditary tendency towards post-maturity. Not infrequently the patient gives a history that her mother also went beyond the expected date (Kerr and Moir, 1949).

Constitution.—The same patient may have several post-mature babies. One patient of mine had five children, and on each occasion there was a normal delivery of an average-sized baby after 44 weeks' gestation. As previously stated, there is a greater chance of post-maturity with women with a menstrual cycle of 31–35 days than with women having a cycle of 21–28 days. This is presumably due to a lengthening of the pre-ovulatory phase of the menstrual cycle.

Rest in Bed.—This may be a factor in prolonging pregnancy. This rest is generally supposed to help in prolonging pregnancy in cases in which premature labour is feared—for example, in multiple-pregnancy cases.

Hormones.—Animal experiment shows that hormonal imbalance plays a part in producing post-maturity; Snyder (1934) was able to procure post-maturity in rabbits by giving progesterone or chorionic gonadotrophin ("antuitrin S"). In humans the problem is more complicated: progesterone does not necessarily prolong pregnancy, although such prolongation has occasionally been reported.

Malpresentation and Cephalo-pelvic Disproportion.—These are frequent causes of post-maturity. In such cases the lower uterine segment is poorly formed and there is no stimulus from an even pressure of the presenting part on the lower pole of the uterus. Browne (1946) states that post-maturity is more apt to occur when the foetal head is above the pelvic brim. According to Malpas (1933), the anencephalic (without associated hydramnios) and the hydrocephalic head do not fit well into the lower pole of the uterus to stimulate polarity, and thus bring about the conditions favourable to post-maturity. It is generally agreed that the occipito-posterior position is, for similar reasons, another common cause of post-maturity, as it is of inertia and poor uterine contractions when labour does start.

Present Investigation

An analysis has been made of the last 4,653 deliveries in the Nuffield Department of Obstetrics in the Rad-

cliffe Infirmary, Oxford. There were 171 in which pregnancy was reckoned to have continued for 42 weeks since the first day of the last menstrual period. This represents an incidence of 3.7%. Of these patients, 42 (24.5%) required a forceps delivery, and 12 (7%) required caesarean section. Thus, in about one-third of the cases operative intervention was deemed necessary. This series therefore confirms the high incidence of cephalo-pelvic disproportion or of malpresentation in association with post-maturity.

Of the nine stillborn babies, four had gross abnormalities incompatible with life. Of the remaining five, only one case could be attributed to post-maturity.

Case Report.—Patient aged 21 years. *First Pregnancy:* Delivery of a stillborn baby 15 days after the expected date of confinement (August 25, 1947). Male child, weight 4 lb. 2 oz. (1.9 kg.). Placenta small and infarcted, weight, 318 g. Blood group, A, Rh+; Wassermann reaction and Kahn test negative. *Second Pregnancy:* Elective caesarean section seven days after the expected date of confinement (July 17, 1948). Female child, weight 4 lb. 6 oz. (2 kg.); died in 11 hours. Post-mortem report: atelectasis of lungs. Placenta small, as with previous pregnancy. Pathological report: "trophoblast wholly syncytial and is evenly distributed; the villi give the appearance of a 28–30 weeks' gestation period." *Third Pregnancy:* Elective caesarean section four days before the expected date of delivery (January 16, 1950). Male child, 6 lb. 6 oz. (2.9 kg.). Baby survived. Placenta small and infarcted.

The above syndrome of a small baby and a small placenta with intrauterine death occurring in consecutive pregnancies is rare, but it has been occasionally observed, and may result in foetal death not only in the post-mature period but at any time before the expected date of delivery.

When the death occurs *before* term the cause is often stated to be "undetermined." In contrast, a death occurring *after* term is usually ascribed to placental insufficiency—and often, it seems, with little justification. In order to obtain a balanced picture of the incidence of intrauterine deaths, the histories of 154 stillborn babies were studied. Twenty-one were found to have died *in utero* from no apparent cause. Of these 21 only one was post-mature (the case mentioned above).

The results given by von Ruette (1949) so closely parallel the results of the present investigation that they are included for comparison, although the conclusions of that worker are different. (Von Ruette studied cases in which amenorrhoea had lasted for 290 days or over.)

Stillbirth and Neonatal Deaths in Post-mature Babies

	Oxford	Basle (Von Ruette)
Total No. of post-mature babies	171	1,003
Neonatal deaths	2	6
Stillbirths	9	22
Analysis of stillbirths:		
Foetal abnormalities	4	6
Toxaemia	1	3
Prolapse and other cord complications	0	7
Induction of labour	2*	2
Impacted shoulder presentation	1	0
Cause of death unknown, ?post-maturity	1	4

* One associated with over-administration of quinine; one with over-administration of "pitocin" (5-unit doses).

Clayton (1941) may also usefully be quoted. In 705 cases in which pregnancy was of 42 weeks' duration or more he found no intrauterine deaths due to post-maturity and only two stillbirths of an unexplained nature, but possibly due to post-maturity.

Treatment of Post-maturity

From the foregoing evidence the following views on treatment seem justifiable:

Overmuch weight should not be given to the occurrence of post-maturity *per se*. For uncomplicated post-maturity no treatment is required: this also is the opinion of Clayton (1941) and of Wrigley (1946). The patient should be reassured, but she should not be admitted to hospital, for rest serves no useful purpose. A medical induction is not reliable as a test for post-maturity, nor is it likely to succeed in the case in which the head is high or the cervix is long and uneffaced.

If post-maturity is complicated by a minor degree of cephalo-pelvic disproportion, surgical induction may sometimes be desirable. Munro Kerr and Chassar Moir state: "Management of post-maturity largely resolves itself into the determination of the size of the foetus relative to the pelvis." In deciding for or against induction of labour, each case should be individually considered and routine induction avoided. Better subsequent uterine contractions and minor improvements in the attitude and position of the child may more than compensate for a week's delay.

With a history of a stillborn small baby associated with a small placenta, induction is advisable a few weeks before the time when the previous baby died. As already stated, these cases are rare.

Nothing in the foregoing remarks is intended to imply that the high head, possibly in the occipito-posterior position, is free from danger to mother and baby. These cases require careful watching and management.

Conclusions

Post-maturity with placental insufficiency is extremely rare. In the present series of 171 post-mature pregnancies it accounted for only one death.

A foetus may die *in utero* for no apparent cause at any time during pregnancy. Deaths during the post-mature period in the 171 post-mature cases amounted to no more than 9 (5.2%). In all save one of these an adequate cause for death was found.

Malpresentations and cephalo-pelvic disproportion are a frequent cause of a high presenting part and a poorly formed lower uterine segment, and are hence the cause rather than the result of post-maturity.

In hospital statistics the foetal mortality tends to be high in post-mature cases. This is because the selection of patients is different from that of patients going into spontaneous labour at term, and failure to diagnose disproportion is common.

The problem of post-maturity resolves itself, to a great extent, into the proper management of malpresentations and minor degrees of cephalo-pelvic disproportion.

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Medical Memoranda

Fatal Case of Acute Ulcerative Colitis with Multiple Perforations

The outstanding features in the following case are the acute onset with no previous history of ulcerative colitis and the complete lack of signs which would lead to a diagnosis of intestinal perforation.

Case Report

A housewife aged 27 was admitted to hospital with a history of some years' constipation and pain and bleeding from an anal fissure. The anal canal was dilated and the fissure excised. The surgeon made a note that there was considerable oozing from the upper rectum, which would require further investigation when the fissure had healed.

Five weeks after the operation the patient was readmitted with a history of diarrhoea for the past two weeks, with blood and mucus in the stools. The abdomen was not distended but was slightly tender. Her temperature was 101.4° F. (38.55° C.). On admission she was given 100,000 units of penicillin four-hourly. Her temperature stayed at 101–103° F. (38.3–39.4° C.) for three days, when 3 g. of phthalylsulphathiazole was given four-hourly in addition to the penicillin. This reduced her temperature to normal by lysis in two days, where it stayed; but her condition deteriorated, the abdomen showing tympanitic distension and, although fairly solid, having a doughy feel. The motions were four or five a day and were liquid, greyish in colour, and very offensive. Repeated laboratory examinations of the blood and faeces yielded no useful information. The patient became gradually worse, and in spite of blood and saline transfusions she died 10 days after admission.

At necropsy the abdominal incision opened into a cavity containing liquid faeces. This cavity was bounded anteriorly by the abdominal wall and posteriorly by the omentum, which was firmly bound down to the colon all the way round and to the posterior brim of the pelvis. So complete was this attachment that the coils of the small intestine under this floor showed no sign of peritonitis. There were numerous perforations in the large intestine; two in the ascending colon, each nearly 2 in. (5 cm.) long and over 1 in. (2.5 cm.) wide; three in the transverse colon of about the same size; and six in the descending colon. These varied in area from the size of a halfpenny to one which was 3 in. (7.5 cm.) long and involving most of the wall. All the ulcers had ragged edges. Where the colon turned over the brim of the pelvis the gut was reduced to one longitudinal muscle band, and the almost free end of the pelvic colon was expanded to resemble a funnel and filled the space between the sacrum and the uterus.

It would appear that liquid faecal matter found its way through the numerous perforations into this false cavity and eventually was collected by the pelvic funnel and passed as a diarrhoeic stool. Histological examination of the wall of the intestine as far away as possible from a perforation showed the mucosal epithelium to be almost completely denuded. The mucosa and sub-mucosa, and in parts the whole wall, were diffusely infiltrated with plasma cells and lymphocytes and some polymorphs. At the edge of the ulcers there was an acute pyogenic exudate into the mucosa.

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