If calcium or phosphorus metabolism were a factor in late pregnancy patients one might expect a high incidence in the early puerperium, but so far there is no record of such a case.

If bone fragility can be excluded the remarkable incidence of fracture of lower ribs consistently left-sided and in late pregnancy could be due to a mechanical cause peculiar to the abdominal mass or compensatory lordosis.

It has already been shown that the mid-thoracic fractures occur along the line of interdigitation of the external oblique and serratus anterior (Oechsli, 1936), and are assumed to be the result of shearing stress. The likelihood of fracture is reported to be increased if the serratus is taut at the time of coughing, as it may be when the arm is raised or when the patient is resting on one elbow (Atkinson, 1898; Seilun, 1917; Oechsli, 1936).

In the group of cases in which fracture occurs in the lower ribs a different explanation must be sought. Expiration, normally passive, becomes forced on coughing, but there is some disagreement about which muscles are implicated. Mainland (1945) gives these accessory muscles as: (1) anterior abdominal muscles; (2) latissimus dorsi, but states that its mechanism is not clear; (3) the long back muscles, the lower parts of which are able to depress the ribs.

A study of the anatomy and fracture sites in the majority of pregnancy cases suggests that the shearing stress occurs along the line between the origin of the external oblique (from the lower four ribs) and the costal slips of the latissimus dorsi. This, however, ignores the long back muscles (sacrospinalis). In the pregnant stance the head and shoulders are thrown back; compensatory to this is a lordosis involving increased postural tone, and perhaps hypertrophy of the iliocostalis and longissimus portions of the sacrospinalis. Incoordination or action of more than normal violence might occur in this muscle in such circumstances. Thus forcible expiration, as in coughing with depression of the lower ribs by the iliocostalis, could provide conditions for a shearing stress sufficient to fracture a rib.

Another possible mechanism is that the uterine mass is driven backwards and upwards against the inner surface of the lower chest in coughing by contraction of the anterior abdominal muscles. The main force would be deflected to the left side by the liver on the right. Whether or not the protuberant abdomen is in any way responsible by altering the action or direction of pull of the external oblique must remain at present a matter for further consideration.

Although a fractured rib is a trivial injury it can produce extreme discomfort and insomnia, particularly in a patient who is coughing. That this is undesirable in late pregnancy is self-evident. It would appear from the literature quoted in this paper, and from the present series collected without propaganda in twelve months from two antenatal clinics, that the condition in late pregnancy is not a rarity, and its frequency is probably greater than hitherto appreciated.

The importance of wider recognition lies in the great relief of pain experienced by the patient with early diagnosis and adequate strapping of the chest. Almost equally important is the avoidance of tiresome confinement to bed and needless investigation, often in hospital.

Summary

A brief review of the literature of cough fracture is given, with particular reference to its incidence in late pregnancy.

The clinical picture usually found in this condition is described.

Brief histories of four cases are reported.

Suggestions are made about the mechanism of the condition.

A case is put forward for this rather trivial injury to be regarded more seriously, and a suggestion is made that its frequency may be greater than is generally recognized.

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LYMPHOBLASTIC LEUKAEMIA TREATED WITH URETHANE

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The use of urethane in the treatment of lymphatic leukaemia is a fairly recent development, and was first recorded by Paterson *et al.* (1946) in 12 cases of chronic lymphatic leukaemia. Five of these patients were alive at the end of the observation period, but the single case of acute lymphoblastic leukaemia showed no response to treatment.

The following case is noteworthy for the dramatic initial clinical and haematological response to urethane in a child with acute lymphoblastic leukaemia.

Case History

A girl aged 14 months, weighing 24 lb. (10.89 kg.), was admitted to hospital on July 19, 1947, with one week's history of anorexia and fretfulness, associated with vomiting for the previous two days. The mother had recently noticed that the child bruised easily. The past history was one of normal physical and mental development, the diet was normal, and no drugs had been taken. The family history was negative.

On examination the patient was seen to be a well-developed but abnormally quiet child with a very pale, slightly jaundiced skin. Small ecchymoses were present on the limbs, though petechiae were not seen. There was uniform enlargement of the cervical glands, and those of the axillae and groins were easily palpable. The spleen was enlarged to three finger-breadths below the left costal margin and was soft in consistency. The liver could not be felt; the mucous membranes showed neither haemorrhage nor ulceration, and no further abnormalities were detected.

A blood count on July 21 showed: Hb, 42%; white cells, 27,700 per c.mm (polymorphonuclear leucocytes 2%, cells of lymphocytic series 98%). Blood film:—Red cells showed anisocytosis, but were well filled. There was no evidence of red-cell regeneration. The lymphocytic series was made up largely of lymphoblasts, but some degenerating "smudge" cells were also present. The granulocytes were of the early type. Platelets were few. The whole blood picture was highly suggestive of acute lymphoblastic leukaemia.

The count was repeated two days later, when the haemoglobin level had fallen to 28%. The clinical condition had markedly deteriorated, and the child was wretched with buccal ulceration

and was having haematemesis and melaena. The temperature rose intermittently to 102° F. (38.9° C.), and the pulse to 160.

As death appeared imminent from blood loss, 600 ml. of Group O blood was transfused, with marked clinical improvement, on July 23. The same day urethane, 1½ gr. (0.1 g.) thrice daily orally, was started.

The succeeding blood counts are shown in the accompanying Table and Chart. The changes in the blood picture were associ-

Record of Blood Counts

Date	Hb %	W.B.C. per c.mm.	Polymorphs, %	Metamyelocytes, %	Lymphoblasts, %	Lymphocytes and "Smudge" Cells, %	Mono-cytes, %
21/7/47	42	27,700	2	—	—	98	—
23/7/47	28	5,500	4	0.5	12	83.5	—
1/8/47	58	11,900	37	—	2.5	58.5	2
13/8/47	66	5,700	60	0.5	2	32	5.5
22/8/47	60	4,000	61	—	—	35	4
1/9/47	110	5,400	42	—	—	57	1
9/9/47	102	5,200	67.5	—	—	30	2.5
23/9/47	100	18,150	76.5	2.5	—	18	3

ated with slow but definite clinical changes from a moribund condition to that of a child behaving normally for its age. She was now afebrile, and although the cervical lymph glands could still be palpated they were considerably smaller. On Aug. 22 the leucocyte count had fallen to 4,000 per c.mm., with 61% polymorphs. Urethane was discontinued, a total of 51 gr. (3.25 g.) having been given over 34 days. A further transfusion of 600 ml. of Group O blood was given to combat leucopenia.

The apparent recovery of the child called for a reconsideration of the diagnosis. A Paul-Bunnell test for glandular fever proved negative. When sent home on Sept. 28 the child appeared to be quite well.

Unfortunately she was not seen as an out-patient because she lived 50 miles away, but in a reply to a letter her private doctor stated that "she went downhill rapidly and died on Oct. 27."

Discussion

Watkins (1947) states that in acute leukaemia of children little or no benefit is obtained from urethane, and that there is not sufficient change to warrant its use other than experimentally. Undoubtedly in this case blood transfusion was a life-saving measure at first, but the dramatic clinical and haematological improvement was far greater than could have been due to transfusion alone. Spontaneous remissions are not uncommon after transfusion in acute leukaemia of children, but a remission rarely lasts more than a week, and the disease is usually fatal within two months of the onset. In the present case the improvement after transfusion was maintained, and would appear to have been enhanced and prolonged by urethane treatment.

The prognosis was exceedingly grave in view of the child's age and of the fall in haemoglobin level to 28%. Paterson *et al.* (1946) attach importance to the initial haemoglobin level, for in three out of four of their cases of lymphatic leukaemia in which the haemoglobin was below 55% the patient died despite adequate blood transfusions.

It is unfortunate that no blood count was done when the final deterioration began, as it is now impossible to say whether this was due to an exacerbation of the original disease or to the toxic effect of urethane on the myeloid cells. This was foreshadowed in the blood count of Sept. 23, when of 18,150 white cells 2.5% were metamyelocytes and 76.5% were young band forms of polymorphonuclear leucocytes.

The use of urethane in this case profoundly modified the disease process, and therefore seems to have been justified.

Summary

A case is described of acute lymphoblastic leukaemia which responded initially to urethane therapy.

The palliative effect in this case would seem to justify further trials of urethane in acute leukaemia.

It is uncertain whether the fatal outcome in the case described was due to the disease or to the toxic effect of urethane on cells of the myeloid series.

Whilst it is probable that the large volume of blood given to this child contributed largely to the remission in the leukaemic state, it seems reasonable to suppose that the duration of this remission was related to the use of the drug.

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Medical Memoranda

Malignant Tumour of the Small Intestine

Malignant tumours of the small intestine are relatively uncommon, although reports on more than 500 cases are now available. Carcinoma is said to occur more often than sarcoma in the proportion of 6 to 4 (Mayo, 1940), carcinoma being found most commonly in the jejunum and sarcoma in the ileum. The age incidence in carcinoma is accepted to be higher than in sarcoma, and the sex incidence is in favour of males in the ratio of 2 to 1.

The following report of a case of adenocarcinoma of the ileum differs from those recorded by Rankin and Mayo (1930) in that no loss of weight occurred and no occult blood was found.

CASE REPORT

A publican aged 59 was admitted on Jan. 6, 1948, complaining of generalized abdominal pain and vomiting. His symptoms first began 11 months previously, and consisted of gripping pains and vomiting in attacks lasting 10 to 14 days. He suffered some half-dozen such attacks, with intervals of about a month's freedom, before consulting his doctor. Two days before admission he developed generalized abdominal pain with vomiting and for the first time he had absolute constipation.

During the 1914-18 war he contracted malaria and sandfly fever while serving in Palestine. Since that time he had always had two or three loose motions daily, but at no time did he notice blood or mucus in the stools. He suffered for many years from winter bronchitis.

On examination he was seen to be a well-built man with no obvious loss of weight. He was in considerable pain and was vomiting at fairly frequent intervals. The abdomen showed a generalized distension, with some diffuse tenderness on palpation, but no mass was felt. He had shifting dullness in the flanks, and loud borborygmi were heard. Rectal examination showed no abnormality. He was given an enema, which produced a faecal result in the form of a foul-smelling, pale, toothpaste-like ribbon. A further enema one hour later was returned unchanged, and a diagnosis of intestinal obstruction was made, the cause of which was not obvious.

Operation.—The abdomen was opened through a lower right paramedian incision and a quantity of straw-coloured fluid escaped from the peritoneal cavity. There was marked distension of the small intestine down to a point 30 in. (76 cm.) from the ileo-caecal valve.