deny any association or aggravation of symptoms with her periods.

Commoner physical features of superficial endometriosis are a finely craggy surface and some degree of fixity to deeper structures, and the appearance, on excising the mass at biopsy, of dense fibrous tissue fused with the surrounding tissues and showing pin-point areas of haemorrhage.

The treatment of this type of lesion presents none of the grave problems of pelvic endometriosis. If the mass can be totally excised with ease, then that is the best remedy, but if there is dense fibrous attachment to important neighbouring structures it does not call for the extremes of wide excision or minute dissection. The lesion will respond readily to local deep x-ray therapy, which destroys the aberrant endometrium. Should the bimanual examination in such cases as these reveal pelvic endometriosis, then artificial menopause must be considered, which, if established, would subdue both lesions.

Endometriosis in relation to the round ligament in the inguinal region is rare but well established. To find the disease creeping on to the thigh as in Case 2, though exceptional, is not such a curiosity as the case recorded by Schlicke (1946), who removed a nodule of endometrial tissue from the back of the left thigh of a Filipino woman.

Supporters of the "implantation" theory might consider the origin in Case 2 as a deposit of endometrium in the sac of a femoral hernia, especially as for some months after it first appeared the swelling was not painful at the periods. Those favouring a "lymphatic deposit" theory find support in the fact that in the first two cases the histological examination revealed the endometriosis to be lodged in lymphatic glands, but whether by deposit or by direct invasion of the glands is undefinable. The recurrence after excision in Case 1 supports the thesis of another lymphatic metastasis. To those adhering to the theory of "metaplasia" the last case is a solace, as no lymphoid tissue was found on histological examination and the lesion was growing in and surrounded by the distal end of the round ligament.

Summary

Three cases are described in which aberrant endometrial tissue occurred in the groin. All cases presented with a lump, which was inguinal in two instances and femoral in the third. Two of these cases illustrate that when an unusual mass is encountered at the groin it is essential to inquire into the possibility of aggravation of swelling and pain at the periods. The other case shows that the patient may deny any alteration of her symptoms at her periods. The characteristic physical features of a fine craggy surface with some degree of fixity to deeper structures may then be the only guide to the real nature of the lesion, and in such cases, as in fact in most instances, biopsy is essential for accurate diagnosis.

The management of an isolated lesion or one associated with pelvic endometriosis is outlined, and the possible methods by which endometrial tissue appears in the groin are briefly discussed.

I wish to thank Mr. J. A. Stallworthy, who treated Case 1 and advised on Cases 2 and 3, and who gave me much help throughout. Dr. G. A. C. Summers kindly supplied the photomicrograph.

REFERENCES

- Lyall, A. (1945). *Glasg. med. J.*, **143**, 93.
Schlicke, C. P. (1946). *J. Amer. med. Ass.*, **132**, 445.

In the first six months of last year more children were immunized against diphtheria by local authorities than in any half-year since the end of the war, states the Ministry of Health. They numbered 347,000, bringing the grand total for England and Wales to 7,567,574. The total for those under five during the first half of the year was 288,000. Before the war there were on the average more than 50,000 cases of diphtheria a year and 2,900 deaths. In 1947 there were slightly over 10,000 cases and 244 deaths.

SOLITARY PLASMOCYTOMA OF BONE

REPORT OF A CASE

BY

H. HOLDEN, M.B., D.M.R.T.

Assistant Radiotherapist, Radiotherapy Department,
Northampton General Hospital

[WITH PHOTOGRAPHIC PLATE]

Solitary plasmocytoma of bone is a rare condition, and this case is presented not only because of its rarity but also because of its location in a rib, a site of involvement never before reported.

The number of cases traced in the literature is about 40, but it seems futile to assert that the case here recorded is the 41st, as whole batches of cases reported in unobtainable journals may have been missed. On the other hand, strict criteria of diagnosis of solitary myeloma will induce one to discard a certain proportion of cases which have been described as such.

Case History

A married woman aged 60, with two children, was first seen by Mr. A. R. Banham, consultant surgeon, at the Northampton General Hospital. She complained of pain in the right shoulder of six months' duration and of a lump in the right neck which had been present for six weeks and was gradually increasing in size.

Clinical examination revealed a coarse crepitus in both shoulder-joints, but there was a full range of movement. A mass was present behind the right clavicle, being attached to deeper structures. The Wassermann reaction was negative, and urinary examination revealed: urates, ++; Bence-Jones proteose, nil; other proteins, nil.

A chest skiagram (Plate, Fig. 1) which was taken before any treatment was started showed the right apical area to be hazy, and the right first rib had been almost completely destroyed. X-ray examination of the remainder of the skeleton revealed no abnormality. A biopsy was performed, and the patient was subsequently referred to the radiotherapy department.

Pathological Report.—"The tumour is composed mainly of small round cells with little pleomorphism. The nuclei stain deeply, and in some of the cells the cytoplasm is sparse. The cells tend to be arranged in clusters with a scanty stroma. The majority of the cells are typical plasma cells" (Fig. 2).

Treatment

The patient was seen in the radiotherapy department by Dr. B. Jolles, consultant radiotherapist. A healed scar was present in the right supraclavicular fossa, where a hard mass measuring 7 by 5 by 5 cm. was found, deeply infiltrating the underlying structures and fixed to the medial half of the clavicle. The chest, both breasts, and abdomen were found clinically clear.

A course of deep x-ray treatment was given through one anterior and one posterior oblique supraclavicular field, the physical factors being: 180 kV, 10 mA, H.V.L. 1.25 mm. Cu, F.S.D. 40 cm., 15 by 10 cm. applicators. A skin dose of 3,500 r was given on the posterior supraclavicular field in 21 days and of 2,000 r on the anterior in 13 days, the overall time being 22 days. An exudative epithelitis which ensued took just over eight weeks to heal completely, and four months from the end of this treatment the mass had completely disappeared.

Throughout the follow-up period the patient remained perfectly well, and radiographs of the affected rib taken three months and two years after treatment are shown in Figs. 3 and 4 respectively. Radiographs of the entire skeleton during this time have revealed no further lesions and Bence-Jones proteosuria has remained negative.

Discussion

This appears to be the first reported case of solitary myeloma affecting a rib, the sites involved in the previously

reported cases being: femur 15, pelvis 4, vertebrae 7, humerus 3, tibia 2, maxilla 2, sternum 1, clavicle 1, and mastoid 1.

Willis (1941), in a review of solitary plasmocytoma of bone, suggested that to establish such a diagnosis, the following criteria could usefully be applied: (1) adequate pathological examination of biopsy material; (2) repeated radiographs of the entire skeleton; and (3) repeated examination of the urine for the presence of Bence-Jones proteose.

Some of the previously reported cases which did not fulfil these criteria did, in fact, subsequently develop multiple lesions. This does not mean that when first seen the lesions were not solitary, and Willis suggests that these were precocious tumours of a multiple myeloma. The lapse of time between initial diagnosis and the appearance of multiple lesions varied from three months to three years. Brewer (1948), in an article on the treatment of multiple myeloma with stilbamidine, reports a case in which the diagnosis was established by the presence of myeloma cells and plasma cells in the sternal puncture material, the radiographs of the entire skeleton showing no lesions and the urine no Bence-Jones proteose (although excess proteins were present). This would seem to indicate that repeated sternal puncture might be added to the above-mentioned criteria of Willis.

In the present case a favourable prognosis after two years appears warranted, but radiological and laboratory tests are indicated for some time in the future, since the aetiological factors in these conditions are unknown and the original underlying cause may at any time produce further lesions.

I wish to acknowledge my indebtedness to Mr. A. R. Banham, consultant surgeon, and Dr. B. Jolles, consultant radiotherapist, Northampton General Hospital, for their kind permission to publish this case; also to Mr. E. J. Pamey, of this department, for the photomicrograph and prints of the radiographs.

REFERENCES

- Brewer, A. E. (1948). *British Medical Journal*, 2, 978
Willis, R. A. (1941). *J. Path. Bact.*, 53, 77.

INFANT MORTALITY

BY

W. J. MARTIN, D.Sc., Ph.D.Lond.

(From the Medical Research Council's Statistical Research Unit,
London School of Hygiene and Tropical Medicine)

Many factors are known to influence infant mortality. These factors have complex interrelations, so that it is impossible to allot relative degrees of importance to them, but they may be broadly grouped into two categories: (1) conditions which affect the whole population, and (2) conditions specific to infancy. Numerous measures have come into operation during the past century which have affected the health of the infant. The gradual improvement in the general standard of living, sanitation, water supply, housing, etc., has affected the welfare of the whole population. At the same time these advances have influenced the health of the infants in two ways: (a) babies are born into a better environment than their predecessors, and (b) they are born to mothers whose standard of health is, on the average, higher than formerly.

The scheme which has been specially directed to the infant and mother grew from very small beginnings to a great national institution. The working of the maternity and child-welfare centres has been directed under three headings—antenatal, natal, and postnatal. It would be expected, therefore, to have influenced the death rate in

each of the three stages of child life—by foreseeing and avoiding preventable difficulties in labour, by reducing the preventable sickness and mortality of the mothers, by reducing the incidence of prematurity and the numbers of deaths of infants and mothers from accidents of child-birth, and by diminishing the deaths from causes due mainly to lack of knowledge of maternal care. The gradual spread of knowledge of infant welfare and management has undoubtedly been a prime factor in the reduction of infant mortality.

The decline of the birth rate has also had an effect on infant mortality, but again it is not possible to gauge the extent of the fall due to this factor. Infants with brethren of school age have a greater chance of contracting the infectious diseases of childhood than babies without older sibs, so that a decrease in the size of families has reduced the amount of early infection, with its higher fatality rate. The mother of a small family has time to give the individuals more care and attention than is possible with a large family, and also she is probably in a better physical condition to do so. Thus economic, environmental, and hereditary factors play an important part in determining the chance of survival of infants.

The decline in the death rate in England and Wales during recent years, when new low records have continuously been established, has been the occasion for the inference that this fall has been due solely to present-day methods of infant care, etc., and even specific reasons have been given. The infant mortality for 1948 was only 34 per 1,000 births, a fall of 7 from the record low level of the preceding year. Judging from the trend of the death rate during this century, it is probable that the infant mortality has not yet been stabilized at this level, since a very large fall has generally been followed by a rise in the succeeding years. It seems of interest, therefore, to review the course of infant mortality during the present century so far as the data tabulated in official statistics will permit.

England and Wales, 1900 to 1947

The rate of infant mortality began to decline at the beginning of this century and has continued to fall fairly steadily up to the present day, although of course there have been some fluctuations. The number of deaths occurring in the first year of life per 1,000 live births was 154 in 1900 and 41 in 1947. The observed rates for the period 1900 to 1947 and the smoothed values obtained by fitting to them a simple exponential curve are shown in Fig. 1. The average annual rate of decline during the present century has been, from the smoothed curve, 2.58%. The trend clearly gives no evidence to support any claim that there has been an exceptional decline in mortality in the last year or two. On the other hand this curve, coupled with the fact that the general adoption by the community of new methods and improvements in child welfare takes time, makes it reasonable to suggest that the rate will continue to decline for some years even if no new advances in infant care are made.

Effects of Urbanization

In the past the conditions of life in the great towns have been conducive to a high infant mortality rate, and it seems reasonable to expect that the improvements made in the general standard of living during the last half-century would have most effect on infant mortality in such areas. It is, however, possible to trace the trend of infant deaths by urbanization for the whole country only from 1911 onwards. Prior to this year vital statistics were tabulated by registration districts, and these districts often included both town and country; moreover, deaths occurring in

W. STANLEY HARTROFT AND CHARLES H. BEST: HYPERTENSION OF RENAL ORIGIN IN RATS FOLLOWING LESS THAN ONE WEEK OF CHOLINE DEFICIENCY IN EARLY LIFE

FIG. 7.—Normal renal cortex from a control animal fed diets containing choline throughout its life. H.E. ($\times 140$.)

FIG. 8.—Cortical arteriole from kidney of control animal. H.E. ($\times 600$.)

H. HOLDEN: SOLITARY PLASMOCYTOMA OF BONE

FIG. 1.—Radiograph before treatment, showing rounded opacity in region of right lung apex and almost complete destruction of right first rib.

FIG. 2.—Section of plasmocytoma. Plasma cells with deeply staining nuclei. ($\times 500$.)

FIG. 3.—Commencing regeneration of right first rib with disappearance of opacity three months after treatment.

FIG. 4.—Two years after treatment.