X Rays and Arsenic.

I was inclined to look upon this appearance of squamous-cell carcinoma on lupus and also in x -ray workers from repeated small exposures of $\frac{1}{4}$ to $\frac{1}{2}$ Sab. B, as being due to an irritative effect of the "soft" rays, the formation of the skin cancer being regarded as similar to that of lip cancer in clay pipe smokers, epithelioma of the tongue following dental irritation, and so on. The parallel between the effects of x rays and arsenic is not without significance. Both may cause erythema, both give rise to pigmentation and hyperkeratosis. Arsenic certainly causes a neuritis, and x rays have been described as doing the same. After the prolonged effects of each we may observe carcinoma. To have looked upon this common action as an over-stimulation was, I think, natural. But, in the words of Dixon:

Arsenic under certain conditions gives rise to a peripheral neuritis which closely resembles that of alcohol. The action is essentially one on the interstitial tissues, the connective tissue sheaths of the nerve being affected in the same way as connective tissue elsewhere in the body. It becomes hyperaemic, shows multiplication of new tissue elements and migration of leucocytes. These changes lead to pressure on nerve fibres, and so to later degeneration.

The end results of prolonged exposures to "soft" x rays are the same on the skin as those of the prolonged use of arsenic. Hyperkeratosis, usually affecting the soles and palms, is peculiar to arsenic among drugs. Hyperidrosis is then often prevalent in these places, appearing as small elevations like millet seeds or small corns. Epitheliomas may develop on these small corns. The hands of the radiographic assistant of early days may be compared with this.

Is it, then, too much to deduce that in the latter case nerve fibres also become degenerated, and that some forms of carcinoma are due to lack of nerve control of the cells? I have heard this theory before, and only suggest that the similarity of action of x rays and arsenic is another fact in favour of the theory.

Mrs. M. was at one time a skin patient. She had also exophthalmos, some cyanosis, dyspnoea, clubbing of fingers, dullness in the sternal region, and other signs, and was sent to the physician for thoracic disease; a diagnosis of mediastinal neoplasm was made. The patient ultimately died of broncho-pneumonia, and *post mortem* a growth around the arch of the aorta, of the size of a small apple, was found.

This patient had some x -ray treatment, and though certainly the case was advanced, her death was not without a lesson, which I now wish to point out with due humility. Such a tumour should be radiographed, and I will even suggest localized. To hand over such a case as "tumour of the thorax" to a lay assistant for radiation is a mistake. His knowledge of anatomy is negligible, of disease still less; and unless careful focussing of penetrating rays in heavy and repeated doses are carefully and accurately applied to the growth, it may be from several angles by a cross-fire method, the chances of hitting the tumour are *nil*. It is therefore essential in such cases to transfer upon the thoracic wall with indelible pencil the findings of clinical and radiographic and localization methods. Accuracy of focus is, I am certain, a primary essential factor in x -ray treatment. The chances of missing with a pencil of rays a tumour the size of a small apple in such a large cavity as the thorax are, of course, very great. Careful localization and markings are of primary importance.

It is easily realized that neoplasms, be they sarcomas or carcinomas, especially if large, will require prolonged treatment. The care of the skin is therefore paramount, for unless great precautions be taken erythema and, too often, burns will follow, preventing further treatment, and consequently destroying all chances of alleviation or cure. A shield on the patient will protect all organs except those in the direct paths of the rays passing through an aperture in the shield. Only the diseased tissues will therefore be irradiated. It may be argued with reason that many foci of infection are possibly present, and that wide radiations are beneficial. If such be the case the prognosis is bad whatever treatment be given. The presence or absence of secondary deposits will sometimes be revealed by radiographic examination.

That the localization of the growth is essential will be easily understood when it is remembered that the power of the rays is inversely proportional to the distance of the

object from the anticathode. For success, therefore, it is essential that the depth of the object be known, for on that, I think, the dosage should also be based. Far less radiation will reach an object 8 in. than one 2 in. deep.

Time will show that the doses we have given are inadequate. Heavier doses of "harder" rays through thicker filters are those that will cause inhibition of neoplasms. We have done well in some cases, failed in others. Where two years ago I gave 4 Sab. B through 2 mm., I now give 8 or 12 B's through thicker filters and the results are better.

My thanks for opportunity and advice are due to Dr. Sequeira; for practical help am I also indebted to Mr. Blackall of the London Hospital. The mistakes are mine.

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CHRONIC INFECTION OF THE FAUCIAL AND POST-NASAL LYMPHOID TISSUE IN CHILDREN.

BY

PERCIVAL W. LEATHART, M.B., B.Ch. CANTAB.,

ASSISTANT SURGEON, LIVERPOOL EYE AND EAR INFIRMARY.

A CHILD with enlarged tonsils and adenoids is not ill because of the increased size, but because of a chronic infection of its faucial and post-nasal lymphoid tissue, which serves not only as a nidus for the manufacture of toxins, but also as a port of entry for many other systemic diseases. This condition of chronic infection is extremely common, and diagnosis is easy if the three cardinal physical signs—enlarged tonsils, rhinitis, and enlarged cervical glands—are kept in mind. Additional physical signs are often to be noticed, such as running ears, bronchitis, mastoiditis, etc., but are more correctly described as complications, and are found as a rule only in neglected cases. That the disease is highly infectious is shown by the following facts:

1. That it is far more frequent among school children than among children who do not go to school.

2. That when one child in a family is attacked the disease subsequently spreads to his brothers and sisters who were previously healthy.

3. Micro-organisms can always be grown from the nasal and post-nasal secretions, which are normally sterile.

For these reasons the disease may be considered as infectious in exactly the same way as measles and scarlet fever are infectious.

Unfortunately in this disease there does not appear to be as great a tendency to spontaneous cure as in some of the other specific infections of childhood; it is a very much more chronic condition, and in consequence of this once a child is attacked he may, and often does, continue in a more or less normal manner for years; but on examination will be found to present the three cardinal signs of the disease, and micro-organisms will be detected in the nasal and post-nasal secretion.

Such a child is, in fact, a "carrier," and is for that reason a source of danger to all healthy children with whom he may come into contact. Because of the chronicity of the disease it follows that nearly all untreated cases are carriers for a longer or shorter period, and this would appear to be a good reason for its frequency.

A sufficient number of bacteriological examinations of secretions from the nasal and post-nasal spaces have not hitherto been made to enable us to be dogmatic with regard to the nature of the specific causal organism. But in a very large proportion of such examinations some form of pneumococcus has been the predominant organism, and in some cases it has been the only one grown. This, coupled with the fact that some form of pneumonia is a frequent complication, renders it possible that the pneumococcus is to blame. But whatever the organism may prove to be it is one which attacks the faucial and post-nasal lymphoid tissue, producing a form of inflammation which is not acute, so that pain is seldom complained of; it is typically a chronic inflammation in the course of

which the lymphoid tissue becomes softer and larger. The infection spreads to the lymphatic glands, draining the inflamed area, causing them to enlarge.

In an uncomplicated case there is no tendency to suppuration either in the lymphoid tissue itself or in the lymphatic glands. Suppuration when it occurs is probably always due to the implantation of one or more of the common pyogenic organisms on a tissue the normal resistance of which has been impaired by disease.

If so much be accepted we may fairly claim that the disease is highly infectious, and that children suffering from it are "carriers," and therefore a source of danger to others.

The treatment required is that of the individual, and preventive treatment.

1. Treatment of the Individual.

The ideal is to render the post-nasal space sterile and the diseased tissue normal; it is doubtful whether this ideal can ever be attained, for the tonsils and adenoids, once they are infected, never appear to regain their normal structure. As in other chronic infections elsewhere, the process whereby infection is eliminated is one in which the diseased tissue is replaced by fibrous tissue, and not until the fibrosis is complete can the disease be said to have been arrested. In this condition, as in other chronic infections, the "natural" cure postulates the disappearance of function in the affected structures.

In these circumstances it is unlikely that any medication will ever be satisfactory; and it is certain that at the present time there is no local application capable either of rendering the post-nasal space sterile or the infected lymphoid tissue normal in structure and function.

In view of the failure of this method of achieving our object we must resort to surgery, and anticipate Nature by removing as much of the diseased tissue as possible. The great advance made in recent years in the treatment of the individual is by the introduction of the operation of enucleation of the tonsils and thorough removal of the adenoid mass.

After this operation, efficiently performed, the majority of children show improvement at once, in that the rhinitis disappears, the cervical glands cease to be palpable, the beds of the tonsils and pillars of the fauces become healthy in appearance, and in some cases the post-nasal space becomes sterile; a sufficient number of bacteriological examinations have not, however, yet been made for us to be sure that this happens in the majority of cases.

There is a definite relation between the thoroughness of the operation and the number of "cures" effected. Partial removal is followed by disappointing results; children are frequently seen of whom it is stated that they have undergone removal of tonsils and adenoids two or even three times, yet the three cardinal physical signs are found still to be present, and, in addition, some complication, such as running ears, which was not present at the primary partial removal.

Apart from such cases as these, there are a few in which even after thorough removal the disease continues unchecked. Perhaps in some of these the lingual tonsil and lateral bands which cannot be removed are sufficient to keep the infection active. In others the inferior turbinates, which sometimes remain enlarged, would appear to be the cause. In the remainder possibly the causal organism is of a different nature, and is able to thrive in the nose and post-nasal space even after the diseased lymphoid tissue has been removed.

2. Prevention.

The reason why no steps have hitherto been taken with regard to the prevention of this disease is possibly to be found in the fact that its infectious nature has not received the attention it deserves.

Preventive measures have been taken with regard to other diseases spread by carriers, such as diphtheria and cerebro-spinal meningitis, which are not nearly so common or far-reaching in their complications, though they are more immediately serious to the individual in that they are more acute; yet in the aggregate the amount of harm done to the community as a whole is insignificant compared to that done by the disease in question.

The harm done by chronic infection of the lymphoid tissue of the fauces and post-nasal space is very great.

Its direct complications are far-reaching, spreading beyond the sphere of the throat and ear surgeon, the ophthalmic surgeon, and the laryngologist, into the domain of the physician, in the shape of bronchial affections and lobar and broncho-pneumonia.

Its indirect complications are even more serious, for the lymphoid tissue, having lost its natural resistance, is rendered more liable to become a port of entry for other specific infections such as tubercle, rheumatic fever, measles, scarlet fever, diphtheria, and influenza. If preventive measures which resulted in lessening the incidence of this disease were adopted, the incidence of all its complications, both direct and indirect, would be lessened also. Further, recognizing that in the above list of complications are included the diseases from which a large proportion of the death and disability of the community results, the importance of stamping out the origin to which they can all be traced is evident.

A discussion of the details of prevention would unduly prolong this article; the difficulties are numerous, but by organization on sound lines much could be accomplished. Encouraging results may be confidently expected from the adoption of open-air schools and vaccination, but before the latter method can be used the specific organism must be definitely isolated.

It is to be hoped that the Ministry of Health will consider the subject of prevention of this "carrier" disease, for until adequate measures are adopted the disease and its complications, both direct and indirect, will continue to be rampant.

Summary.

1. The disease is highly infectious.
2. It is spread by carriers.
3. Its complications cause widespread death and disability.
4. The treatment of the individual is satisfactory if complete removal be carried out.
5. The necessity for preventive measures is urgent.

RUPTURED GASTRIC ULCER IN AN OLD MAN: LAPAROTOMY: RECOVERY.

BY

ANDREW FULLERTON, C.B., C.M.G., F.R.C.S.IREL.,
SURGEON, ROYAL VICTORIA HOSPITAL, BELFAST;

AND

T. S. S. HOLMES, F.R.C.S.ENG.,
SURGICAL REGISTRAR, ROYAL VICTORIA HOSPITAL, BELFAST.

A SUCCESSFUL case of laparotomy for ruptured gastric ulcer at an advanced age is sufficiently rare to justify the publication of the following:

Mr. W. G., retired civil engineer, aged 78½ years, had enjoyed good health all his life and was never known to suffer from dyspeptic symptoms till within a week or so of his present sudden illness. He had always been very regular in his habits and most abstemious in diet. Lately he had confined himself to two substantial meals a day, breakfast and lunch. The latter meal was generally taken at 2 p.m. A cup of tea without solid food at 6.30 p.m. completed his diet for the day, and nothing more was taken until next morning.

History.

In April, 1909, he was operated upon by one of us (A. F.) for stone in the bladder, and in May, 1911, for enlarged prostate. Except for a small ventral hernia in the neighbourhood of the suprapubic scar, he had remained well until a week previous to the present illness. During this week he had suffered from rather vague dyspeptic symptoms with some tenderness in the right epigastric region. On the day of perforation, December 16th, 1919, he had a meal of haddock and rice pudding at 2 p.m. At 6 p.m. he was sipping his usual evening cup of tea when a sudden severe pain in the epigastric region doubled him up. When seen at 7.30, he was in great agony, cold, clammy, and blue, with rigid abdomen and dilated pupils. The pulse was 50, weak and irregular, and his general condition so serious that death appeared imminent. He was given morphine gr. ½ in three doses at short intervals, with very little if any relief of pain. At 9 p.m. he was again thoroughly examined. The abdomen was like a board, the liver dullness was diminished but not lost, and there was no evidence of fluid in the flanks; he was cyanosed, the pulse was 65, and the heart's apex was outside the nipple line. His arteries were hard, tortuous, and ringed. There was no vomiting. The pain was now more general, but the maximum intensity was in the epigastrium. The bowels had acted as usual that morning.