in the morning as well as evening for a day or two. Consultant opinion suggested the possibility of pressure on the subclavian vein by tuberculous glands, causing obstruction to lymphatic and venous flow, and sanatorium treatment was advised. Three weeks of this excluded the diagnosis of any active tubercle, and further consultant opinion declared a diagnosis of subclavian vein thrombosis. The arm was massaged, and seven weeks after the onset of the condition all swelling had subsided. In October the patient started rowing again, but at the end of a week the arm had swollen a little and he stopped. Early in January rowing caused some swelling, for which I advised massage. From this time there was improvement, and the patient continued to row without recurrence of swelling until he left Cambridge eighteen months later. He reports good health and no further trouble up to July, 1933.

COMMENT

These two cases presented most of the characteristics of primary axillary vein thrombosis mentioned by Mr. Cosbie Ross, but no "firm tender cord in the vicinity of the axillary vein" could be felt, the thrombosis being presumably in the subclavian vein or possibly in the first part of the axillary vein, which could not be palpated. Both subjects were muscular beyond the average and had good histories, both past and familial. It is unlikely that tuberculous glands in the second case could have caused sufficient pressure to produce a cyanosed and swollen arm without considerable constitutional upset. Moreover, within three weeks of observation at the sanatorium, he was declared to be in excellent health, without any signs whatever of active tuberculosis. Nor does his subsequent rowing career, commencing a few months later, give any support to this possibility.

Of the four theories quoted by Mr. Ross to account for this form of thrombosis, three give the causation as expiratory effort combined with muscular strain, and two of these define the movement causing damage to the vein as abduction of the arm.

In rowing there is little abduction of the upper arm. The amount varies with individual style, but at the worst the abducent movement is not more than 45 degrees from the hanging position. There is, however, a good deal of shoulder play at different parts of the stroke, so that the clavicle, pivoting about the sterno-clavicular joint, goes through a considerable range of movement. At the finish of the rowing stroke the outer end of the clavicle is pulled backwards and downwards, and I would suggest that this action may cause pressure on the subclavian vein as it passes over the first rib, and that such a pinching of the subclavian vein is assisted by the pressure of the backward and downward swinging clavicle against the contracted anterior scalene muscle, combined, as Pearce Gould and Patey suggest, with pressure on the vein by the contracting subclavius muscle.

Idiosyncrasy of anatomical structure, size, or position of bone, ligament, or muscle may be the predisposing factor in all cases of thrombosis from effort; and the fact that nearly all the reported cases are right-handed and of the male sex gives support to the theory of trauma through pressure or pinching by surrounding structures of more than ordinary development. The axillary vein, ending as it does at the outer border of the first rib, is not subjected to bony pressure, and it may be that an axillary vein thrombus has its origin in thrombosis of the subclavian vein.

That the subclavian or axillary artery (and presumably with it, the vein) can be compressed has been demonstrated to me by Dr. A. B. Appleton of the Anatomy School at Cambridge, who, by a certain movement of drawing the shoulder downwards with the arm hanging, is able to stop his radial pulse.

The *British Medical Journal* of November 26th, 1932, contained a report of a paper read before the Pathological Society at Manchester by Mr. Peter G. McEvedy on

aseptic phlebitis. This paper, which Mr. McEvedy has kindly allowed me to read, is an interesting contribution to the subject, and deals also with primary thrombosis of the axillary vein. The author, in discussing its causation and pathology, points out that embolism is rare, and emphasizes the importance of ambulatory treatment.

SOME OBSERVATIONS ON WHOOPING-COUGH AND ITS TREATMENT BY VACCINES

BY

R. W. COCKSHUT, M.B.

Whooping-cough kills over 6,000 children every year, and is remarkable for the harshness of its sequelae. The frequency of tuberculous infection of lungs and mediastinal glands is well known, and the possibility of damage which does not at once show itself in any gross lesion is worthy of notice.

The winter of 1932-3 saw an epidemic of great severity. I treated some two hundred cases. At the beginning an attempt was made to keep elaborate records, but this had to be abandoned. Most of the patients were the children of poor people, and, of course, were treated at home. The projected records were to be an attempt to tabulate, for instance, the number of spasms during the day and the night, temperatures, pulse rates, and the approximate average number of expiratory efforts before the whoop. This last, if carried out efficiently on a large group of cases, would be of great value. It was soon evident that this would lead to confusion and inaccuracy, as each case would depend upon a different observer—usually the mother—and a spasm called fearful by one would be almost unnoticed by another. I regretfully came to the conclusion that a more accurate clinical impression would be gathered on my own observations during the visit and by a general questioning of the relatives. For these reasons no detailed percentage list of cures, partial cures, etc., is given. This omission can only be remedied by hospital observation of large numbers of cases of *all types*. Hospital figures are unreliable, because mild cases are not admitted.

The picture of pertussis as an acute infection with or without complications appears to be misleading, and I suggest that pneumonia, for example, is often not a complication in the true sense, but a terminal condition. The child dies or recovers according to the severity of the original infection, his powers of resistance, etc., and not according to the extent or severity of the "complications." In short, whooping-cough, at any rate in its worst form, ought to be regarded as an acute generalized infection. The ordinary course of the disease is one where the whoop is the dominant feature and the patient remains "well" throughout the illness. In the severe type to which I wish to direct attention the patient is seriously ill from the very beginning.

CLASSIFICATION

The severe type, which does not appear to be separated in the literature, might be called the malignant type, and there are five main points which distinguish it quite clearly.

1. *The Whoop*.—This is *never* the dominant feature.
2. *Temperature*.—I know of no disease in which pyrexia is of more importance as a single sign; and suggest that a temperature of 100° or more for a period of four days in the first ten days of the illness is a very serious prognostic omen.
3. *Pallor*.—This is marked and constant and of great gravity.

4. *Loss of Interest*.—This occurs at from seven to ten days from onset, and is so marked in some cases that it is impossible to get the child to follow with his eyes the movement of a favourite toy held before him. It occurs in exact relation to the severity of the case.

5. *Loss of Whoop*.—When this happens in conjunction with the other four signs recovery is almost hopeless. Children with a severe attack of ordinary whooping-cough will cough till they are exhausted and unable to support the weight of the head upright, drooping in their mother's arms, and yet will somehow summon the energy to whoop again in a few minutes' time. But children with malignant whooping-cough do not whoop after a time. They just cough spasmodically, and this loss of whoop is perhaps the most serious sign of all.

Convulsions, though a serious pointer, occur in ordinary whooping-cough, and, indeed, are uncommon in the malignant type, except when due to a terminal meningeal involvement. Instead, therefore, of the classical description of the textbooks of whooping-cough of all degrees of severity, with or without complications, I believe that there are two separate, distinct divisions of the disease—the *malignant type*, where the patient dies of "blood poisoning" and has perhaps a terminal pneumonia or meningitis, and the *ordinary type*, with which we are all familiar, and in which there may be true "complications." The malignant type is, I think, the most appalling of all the diseases of childhood, in its slow, uninterrupted, inexorable progress.

So far I feel that I am on fairly safe ground, but in coming to treatment I feel very differently, and offer my experience with the greatest diffidence.

VACCINE THERAPY

For some years I have had what appeared to be excellent results with vaccine, and last winter I was anxious, by careful tabulation, to put the matter beyond doubt. Why that was given up has been explained. What follows is the conclusions reached after attempts to allow for errors due to some parents' belief in anything in a hypodermic syringe, and to some fathers' objections to "anything to do with vaccination." These observations do not apply to the malignant type, in which the life of the child depends on his latent strength and the skill of his nurses. The effect of vaccines in any doses in these cases is, I think, harmful.

The vaccines used in my cases were:

1. *St. Mary's Hospital (Parke Davis)*

Bordet's bacillus	...	500	millions per c.cm.
Influenza	"	250	" "
Pneumococcus	...	20	" "

2. *St. Paul's Hospital (Genatosan)*

Bordet's bacillus	...	10,000	millions per c.cm.
Influenza	"	5,000	" "
Pneumococcus	...	5,000	" "

The latter is, of course, a detoxicated vaccine, and is twenty times as strong as the ordinary one. There is no danger in vaccines in whooping-cough, and after a reasonable initial dose for conscience' sake enormous doses can be given with safety. Indeed, it is for massive doses that I plead. The largest dose-for-age I have given is 15,000 millions (the figures refer to Bordet's bacillus) of the detoxicated vaccine as a second dose, to a child 9 months old. The dose recommended by the makers is 1,000 millions, so that this was fifteen times the dose suggested. The result was in every way more than satisfactory. Among colleagues who have failed with vaccines I have found that the tendency is to give even less than the recommended doses. To get results it is necessary to give at least five times the ordinary amount. I gave these large quantities to some sixty cases last winter, with-

out any ill effect beyond a slight reaction when using ordinary vaccine. Dosage varies with age, but at, say, 1 year I would suggest second doses of 400 millions of ordinary, and 8,000 millions of detoxicated vaccines, with maximum quantities of 1,000 millions and 25,000 millions respectively. The most startling result of vaccine therapy is seen in the cases which have an acute exacerbation some time after all cough has ceased, and suddenly start to whoop twenty or thirty times a day. A large dose of vaccine has a really dramatic effect. I am persuaded that by use of vaccine the period of the disease is shortened, and there is a marked diminution in the number of spasms in the twenty-four hours, and in the severity of the individual spasms. I think that better results are obtained with ordinary vaccines—that is, non-detoxicated—but I do not feel quite convinced of this. Since I started to use these large amounts I have never treated a case in this way without definite benefit.

There are apparent contradictions in these observations, but I am quite happy about this. Clinical observation has always preceded scientific investigation, and I hope and believe that when the reactions of the living organism to infection are fully understood, many things which now appear contradictory and inexplicable will fall naturally into their proper places to form a complete picture.

Nowadays most doctors carry a hypodermic syringe in spirit. It is very difficult to clean and get free from spirit, and this must make a difference to many substances. The following method may be useful. The syringe and case are kept lying in spirit overnight. They are then washed in water and left to dry. When dry, the syringe is put into the case without any spirit at all. As the outside of the barrel only is handled at each injection the inside of the syringe is kept sterile for all practical purposes during a round of visits. A tube of sterile hypodermic points (fitting into the usual adapter) is carried and a clean needle used for each patient.

Memoranda

MEDICAL, SURGICAL, OBSTETRICAL

A CASE OF PAROTID CYST

Parotid cysts are mentioned in textbooks of surgery, but very few have been described. The following instance may therefore be of interest to readers of the *Journal*.

A man, aged 65, consulted me about a swelling on the face, which he had had for nine months. It was situated on the left side, in front of the lobule of the ear, and was the size of a pigeon's egg. The skin was freely movable over it. Fluctuation was absent. No signs of inflammation were present. I diagnosed a mixed-cell parotid tumour. Mr. D. Patey, who operated on this case, agreed with the clinical diagnosis. At operation a greyish tumour was found. On dissecting this out the knife accidentally pierced its wall, and a large quantity of clear fluid escaped. The nature of the swelling then became apparent—it was a large parotid cyst. The cyst wall was carefully dissected away. The pathologist reported as follows: "Section shows a cyst wall of fibrous tissue, lined by a single layer of flattened epithelial cells. Adherent to the outer aspect of the cyst wall are fragments of the parotid salivary gland, showing areas of infiltration of chronic inflammatory cells." After the operation the patient developed an external fistula of the gland. The duct was patent. Saliva was oozing out from the internal orifice of the duct when the patient was tested with food. After six weeks of annoyance to the patient the fistula closed, when he chose to try a liquid diet only for three days. It is now nine months since the operation. The scar is sound, and there is no recurrence.

I wish to express my gratitude to Mr. D. Patey for his kind help in this case.

London, N.W.11.

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