

4. Cholesterol stone associated with acute purulent cholecystitis.
9. Pure biliverdin stones.
10. " " " coated with cholesterol.
12. D. Bilirubin stones coated with cholesterol.
22. Partly absorbed stones.
- H. Large single stone in gall-bladder.
15. Barrel-shaped stones.
44. Mosaic of gall-stones in gall-bladder.
- E. Multiple-faceted biliverdin stones.
- F. " " bilirubin "
43. Typhoid cholecystitis.
1. Agate showing lamination.
- J. Laminated stone covered with cholesterol.
- 40, 40a, 40b. Intramural calculi.
57. Recurrent stones formed round silk sutures.
19. Small calcium carbonate stones.
20. Large " " "
21. Putty-like mass of calcium carbonate.
- 21a. " " " " " with common stones.
24. " " " " " " from case of acholuric jaundice.

ON "ACROPARAESTHESIA" AND SO-CALLED "NEURITIS" OF THE HANDS AND ARMS IN WOMEN

THEIR PROBABLE RELATION TO BRACHIAL PLEXUS PRESSURE BY NORMAL FIRST RIBS

BY

F. M. R. WALSHE, M.D., D.Sc., F.R.C.P.

During the past four years I have seen an unusual number of cases in which the presenting symptoms have been numbness, tingling, and "uselessness" of the hands and fingers in women, often associated with severe pain and a variable degree of disability. By the time such patients reach the neurologist they have usually been given prolonged, various, and largely ineffective treatments. It is improbable that my experience in this matter is unique, but since there is clearly general uncertainty as to the aetiology and nature of the condition and as to the means of dealing with it effectively, a short account and some suggestions as to its causation may not be amiss.

I have said that the patients are women, but the incidence of the syndrome may be still further restricted. The sufferers fall into two main categories. The most numerous are middle-aged or elderly women, normally unaccustomed to full housework or other forms of manual effort, who, under wartime circumstances, have been obliged to undertake the entire work of their homes with all that this involves in the preparing of food and meals, cleaning, shopping, standing in queues, and the carrying of heavy shopping baskets. The second category is composed of younger women who, in addition to the not light tasks enumerated, have also done part-time work in industry, or have had the burden of childbirth and the care of young children.

In both categories the history has the following characteristic features. The symptoms have been gradual in onset and consist of intense sensations of numbness and tingling in hands and digits. These are greatest on waking in the morning, when they make the fingers clumsy and weak. By the time the patient has dressed, the symptoms have lessened and hands and fingers regain much of their dexterity. Nevertheless, they remain uncomfortable and less than normally nimble all day, and in the evening, when the major burden of the day's work is over, the symptoms increase again. During the night pain and paraesthesiae in the fingers may awake the patient, the pain being of a burning character. The subject may have to adopt various measures to secure relief: getting up and walking about, putting the arms over the edge of the bed, or placing them upon the pillow above her head. In yet other instances the night is the period of relief. An unusually hard day's work aggravates the symptoms, while such tasks as ironing, washing, and the carrying of heavy baskets are especially provocative of severe accesses of pain and numbness.

After some weeks or months the symptom-complex reaches its maximum, and thereafter fluctuates in severity and disabling quality from patient to patient. It varies also from time to time according to the patient's general health and state of

fatigue. Pregnancy and the care of the child after confinement undoubtedly aggravate the condition.

The response to the treatments commonly adopted is uniformly disappointing, for whatever the mode of therapy the patient is commonly expected to remain ambulant and to follow her normal routine of life. The sage-maxims of Hilton in the matter of rest are forgotten, and find an ineffective substitute in injections of vitamin B₁, the oral administration of vitamin combinations, and diverse forms of physiotherapy. The patient is treated by what is thought to be science, and certainly not by anything that can be called the art of medicine. In middle-aged women, of course, the oestrogens are invoked with no fruit, and when the desperate patient has sought relief from practitioners not on the *Medical Register* "manipulation of the spine" has still further added to her torments.

A few of the sufferers have discovered for themselves that a rest or holiday affords remarkable relief, but the fact provides a clue that no one is interested to follow to its logical conclusion—namely, that it suggests a mechanical origin of the syndrome.

On examination the subject is commonly found to show the general indications of chronic fatigue, and indeed the sense of fatigue may be one of her bitterest complaints. The musculature is atonic; often the shoulder girdles are set notably low, so that the line of the clavicle as this is followed out from the sternal end is almost if not quite horizontal. It is known that this state of affairs—a progressive lowering of the shoulder girdle—is the rule in women as middle age is reached and passed, and it is therefore not always clear that this sagging is beyond the limits of the normal; but my own impression is that this is commonly so in these cases. In a proportion of them traction on the dependent arm obliterates the radial pulse, though this is not constant, and may indeed be found in persons who are symptomless.

There is no muscular wasting, but almost always marked tenderness of the extensor muscles in the forearm, and sometimes of the thenar and adductor muscles of the thumb. Objective sensory loss is exceptional, though when pain and paraesthesiae are maximal there may be some blunting of cutaneous sensibility over the digits. Cyanosis or pallor of the fingers is occasional, but Raynaud's syndrome is no essential part of the picture. The pain and discomfort and the muscle tenderness may lead to some apparent weakness of grasp and to notable clumsiness of finger movements. Radiography reveals no abnormality except the lowering of the outer end of the clavicle already alluded to, but of course an occasional case of cervical rib is revealed in this way.

In brief, the condition is one in which subjective symptoms predominate or exist alone and objective signs are scanty.

The syndrome is not unfamiliar to clinicians, but what is new is its widespread incidence. Formerly confined to women habitually doing heavy work, such as washerwomen, it is now found throughout the social scale. One other point may be made at this juncture, in anticipation of what is to be said of treatment—namely, that the symptoms characteristically respond to rest, but not to any other modes of treatment unless rest accompanies them, when it may be suggested that they are superfluous and inoperative.

Aetiology

The condition thus briefly described is the one familiar to us under the uninformative title of "acroparaesthesia." In textbooks of medicine it finds cursory mention among vascular diseases and is described as a vasomotor neurosis—a meaningless term that is nowhere defined, and one for the use of which no reasons are offered. Authors stress the absence of objective signs, and agree that it is bilateral and common in middle-aged women, in debilitated subjects, and—in way of a parting shot—in those who are emotionally unstable.

Treatment is generally allowed to be unsatisfactory, and includes radiant heat, massage, ionization, diathermy, thyroid extract, calcium of course, bromides, salicylates, and vitamins. Not one of these remedies but has been described as useless by some writers, valuable by others. No one can doubt that the syndrome will shortly be conscripted into the swelling ranks of so-called psychosomatic disorders, from which it will with difficulty be rescued for medicine proper.

It is now often diagnosed as polyneuritis or, when it is seen in or immediately after pregnancy, as the polyneuritis of pregnancy, and it is in these circumstances made the subject of recondite speculations as to the metabolic disorders and vitamin deficiencies of this state. It may be doubted whether polyneuritis is in question at all. Multiple symmetrical peripheral neuritis, to give it its full name, has certain constant objective signs which include paresis, loss of tendon-jerks, sensory loss, and a distribution involving all four limbs, the lower limbs being the most severely affected. We know nothing of a polyneuritis affecting the upper limbs alone and unaccompanied by the objective signs enumerated. In short, the syndrome of acroparaesthesia does not come in this category at all and cannot rightly be labelled "polyneuritis."

When we not only survey the signs and symptoms of acroparaesthesia but consider also the factors of general health which accompany its appearance, we find that the factors common to all cases are fatigue and debility and the heavy use of the arms and hands. There is no evidence that pregnancy *per se*—that is, as a state associated with metabolic or toxæmic disorders—is a causative factor, but like debility and asthenia it is an added physical burden to an already overworked woman. In short, the incidence of acroparaesthesia among women may be related to a simpler and less speculative factor than these; namely, to an anatomical factor—the topographical relation of shoulder girdle to upper thoracic outlet.

In a recent paper on rib-pressure syndromes in association with cervical, rudimentary, and normal first thoracic ribs (Walshe, Harvey Jackson, and Wyburn-Mason, 1945) the authors make a passing reference to the syndrome which is the subject of the present paper and suggest that this also is a rib-pressure syndrome, the rib in this case being a normal first rib. Rib-pressure syndromes fall into two categories: those in which the upper thoracic outlet is abnormal from the presence of a rudimentary seventh cervical or first thoracic rib, and those in which the operative factor is an altered relationship between the shoulder girdle and a normal upper thoracic outlet. This last is the category now in question.

The components of all rib-pressure syndromes are nervous and vascular, and in the individual case either or both may be present. Reasons are given in the paper referred to for thinking that the vascular symptoms are invariably due to interference with the flow of blood through the subclavian artery, either as it crosses the edge of the thoracic outlet or by compression in certain positions of the arm between clavicle and thoracic outlet. The nervous symptoms are similarly caused; and here also, contrary to what has been commonly believed, the elements of the brachial plexus involved may be caught between the arms of the vice formed by clavicle and rim of the thoracic outlet. Costo-clavicular compression of the subclavian artery and vein has been fully discussed in an earlier paper by Falconer and Weddell (1943), but these authors did not consider whether nervous structures might also be affected in this way.

It is not germane to the purpose of this paper to describe the major symptoms that may ensue in cases of normal first-rib pressure. These are fully discussed in the paper by the three authors already referred to. What is here submitted is that traction and compression of the lower trunk of the brachial plexus and possibly also of the subclavian artery are the essential mechanical factors underlying most, if perhaps not all, cases of acroparaesthesia in women, that these factors are caused by sagging of the shoulder girdle, and this, in turn, is a natural consequence of an atonic supporting musculature. In the group of cases under consideration the traction and compression are minimal, capable of producing pain, tingling, and numbness, and at times some cyanosis of the digits with coldness, but not adequate to produce the graver nervous or vascular disorders. Whereas rib-pressure syndromes due to an abnormal upper thoracic outlet (rudimentary cervical or first thoracic rib) are usually unilateral, because the thoracic outlet in these cases is commonly asymmetrical, the minor normal first-rib-pressure syndromes are bilateral, because here the thoracic outlet is symmetrical and the sagging of the shoulder girdles—being dependent upon a general muscular atonia—is also bilateral. If the symptoms are more marked on one side this is commonly the right, the right hand and arm being the more constantly and heavily used.

We have, in short, a simple mechanical factor capable of producing the characteristic syndrome of acroparaesthesia, and corresponding in its incidence to the clinical group in which the syndrome is found—namely, the debilitated, atonic, and fatigued woman, either middle-aged or recently recovering from illness or childbirth.

The temptation to find a single pathology for a well-defined clinical syndrome is a strong one, and may often be fallacious, as we have recently seen in the sweeping and unsubstantiated doctrine that all cases of sciatica are due to herniated intervertebral disks. Nevertheless we may regard the mechanical factors that have been described here as probably accounting for the great majority of cases of acroparaesthesia in women, and as factors to be excluded before more recondite and speculative aetiologies, metabolic and dietary, are invoked. It should be added that this view of the aetiology of acroparaesthesia has been expressed by other writers in the past, notably by Wartenberg (1936, 1944), and is therefore not here advanced as original, but rather because current modes of treatment show it to be generally unfamiliar to clinicians. The remedy proposed by Wartenberg, however—namely, division of scalenus anterior—is not recommended, as being unnecessary and, when performed, usually fruitless.

Treatment

If, as has been postulated, we are dealing with a mechanically produced "neuritis" of components of the brachial plexus, sometimes with an associated minimal interference with the blood supply to the upper limb, it might be expected that rest—either rest in bed or the simple cessation of manual work—would produce appreciable relief and final disappearance of symptoms. That this does in fact occur is the submission of this paper. It is further submitted that rest is the only effective treatment. The majority of the numerous patients who have come under my own observation have, as already stated, been given prolonged and sometimes heavy dosage with synthetic vitamin B₁, as well as various forms of physiotherapy. When these procedures have not been accompanied by rest they have, in my experience, proved futile, and this also is what might be anticipated if the view as to aetiology taken here is the correct one.

No one is better aware than I that to advise rest from routine housework may often be an impracticable counsel of perfection. Nevertheless if this be the essence of treatment it is important that we should realize it. We have to face the reality of the situation and to avoid putting ourselves in a false position by advising measures of treatment that are invariably ineffective; and that they are so the accounts of acroparaesthesia in the textbooks, as well as personal experience, must have convinced most of us.

In the most severe cases, therefore, an initial period of a week in bed, propped up during the day, with the arms in slings and taken out only for feeding and other necessary purposes, is the most rapidly effective way of securing relief from pain; thereafter a longer period of abstention from heavy housework, and the supporting of the arms in slings whenever possible while the patient is standing or walking. During this second period massage to the shoulder girdles and general tonic treatment tend to prevent recurrence. Analgesics also have their uses in some cases as an adjuvant. If these things can be achieved, other modes of treatment have no value. To ply these unfortunate women with vitamin B₁ is as irrational as to sacrifice a goat to Aesculapius or to send them forth upon a healing pilgrimage to Epidauros.

Summary

The common and well-defined syndrome that goes by the name of acroparaesthesia and is recognized as peculiar to women patients engaged in manual work, when they are debilitated or fatigued, and usually when they are in middle age, is considered as a manifestation of a rib-pressure syndrome. The rib in question is the normal first rib, and traction and compression are exerted on the lower components of the brachial plexus, and sometimes also upon the subclavian artery, when from muscular atonia the muscles supporting the shoulder girdles allow these to droop and sit at an abnormally low level. In short, acroparaesthesia is a mechanically produced syndrome. There is no evidence available for regarding it as dependent upon abnormalities of metabolism—either toxæmic or due to dietary deficiency—or as standing in any specific relation to pregnancy *per se*.

The essential treatment is rest for the limbs. No other treatment is essential, or useful when given without rest. If there be other causes of this familiar syndrome their operation has not so far been demonstrated.

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MISSED CASES OF INFECTIVE HEPATITIS*
EVIDENCE OF LIVER DAMAGE WITHOUT SYMPTOMS
AMONG A COMMUNITY AT RISK

BY
M. R. POLLOCK, M.B., B.Ch.

There is a widespread conviction that many cases of infective hepatitis fail to be recognized either because jaundice never develops or because symptoms are so slight that the patient does not seek medical advice. Cases with typical symptoms and abnormal liver function tests but no jaundice are well known to occur, although there is difference of opinion as to their frequency. This problem has been discussed in a separate paper (Pollock, 1945). In many of these so-called "subicteric" cases—particularly among children, in whom the disease is known to be generally milder than in adults—symptoms are minimal; and even in cases that do develop jaundice there are reports of this being the first or only symptom of the attack. Where jaundice occurs the case will not often be missed, whether other symptoms develop or not, but if by any chance it were possible for infection to occur in the absence both of jaundice and of subjective symptoms, the case would almost certainly be missed even under close medical supervision. Such persons would fall into the category of subclinical "ambulant cases" and, although themselves suffering no inconvenience, might be just as capable of transmitting the disease as a fully developed case. Ideally they would be detected by isolation of the infective agent or by specific serological tests; but unfortunately this is not yet practicable. If, however, subclinical infection were associated with some degree of liver damage it might be possible, by the use of a sensitive test of liver function, to obtain suggestive evidence

by investigating a section of a community exposed to risk. Hallgren (1943) has reported raised serum bilirubin values among contacts during an epidemic in a sanatorium, but in view of the wide individual variation known to occur in serum bilirubin concentration it is uncertain how much significance should be attached to his results. In any case, the possibility of liver damage occurring in the absence of symptoms was considered of sufficient epidemiological importance to merit the present investigation.

Methods

For the continued investigation of large numbers of contacts during an epidemic it was necessary to choose a simple liver function test which could be rapidly performed and easily repeated. For this purpose the detection of small quantities of bilirubin in urine by the sensitive method described by Hunter (1930) was considered most suitable. Work (Pollock, 1945; Gellis and Stokes, 1945) on the pre-icteric stage has shown that bilirubin appears in the urine early in the disease, before the serum bilirubin starts to rise, and the test had been found consistently negative in a large series of healthy persons.

The technique of the test and method of collection of samples were slightly modified (Pollock, 1945) in order to increase the sensitivity and allow specimens to be kept for 2 to 3 days before analysis without undergoing deterioration.

Results

A good opportunity for testing contacts occurred at the beginning of 1945 in a residential nursery (Nursery A) for children from 2 to 5 years old. Cases of infective hepatitis had been occurring singly or in pairs among members of the staff at approximately monthly intervals since September of the previous year. The place was excellently run and the standard of hygiene and nursing was high. There was a fairly large turnover of staff, both domestic helps and student nurses, but the population of children (total about 35) remained fairly constant. There was little direct contact between children and the outside population, apart from occasional visits of parents.

On March 11 one of the children (P.H.) became ill and developed jaundice 6 days later. This was the first known case among the children, and it was decided that this would be the most suitable time to begin a mass investigation

of contacts. Accordingly, arrangements were made for the collection of early-morning samples of urine thrice weekly from 17 children (chosen solely on account of their reliability in providing specimens). The investigation went on continuously for 10 weeks, although by this time 4 of the children had left.

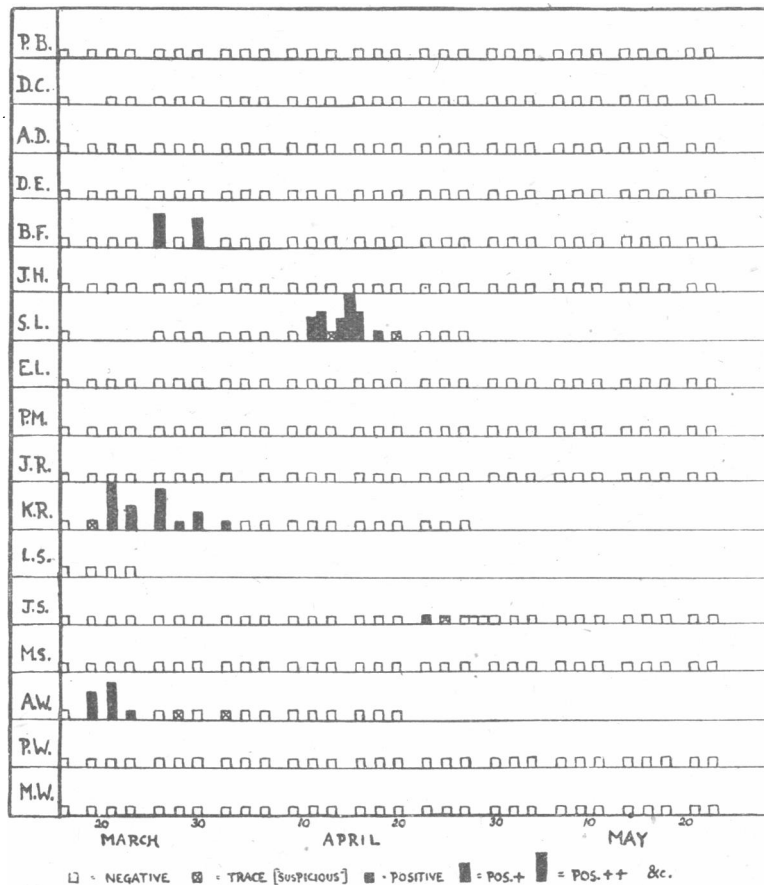


FIG. 1.—Nursery A. Serial Hunter's tests for bilirubinuria in child contacts of infective hepatitis.

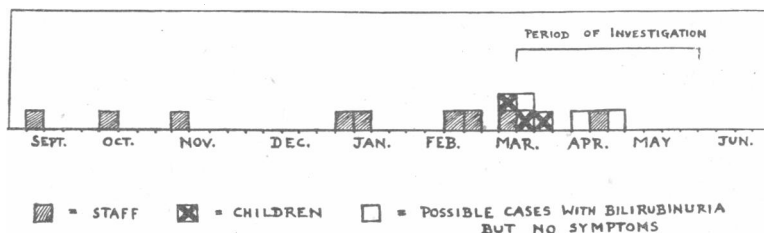


FIG. 2.—Weekly incidence of cases of infective hepatitis in Nursery A.

* A report to the Medical Research Council.