CLINICAL PATHOLOGY IN GENERAL PRACTICE

THE COLLECTION OF FORENSIC SPECIMENS

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A great responsibility rests upon the practitioner, be he in clinical or pathological practice, who is called upon to make an examination and obtain material which may be of use in a court of law. However few or many the specimens he may see fit to take, there are certain guiding principles to observe. He should take the specimens himself and see that they are properly labelled and sealed; he should obtain a receipt from the officer or laboratory to whom they are handed; and he should remember that there is no time like the present, since in most forensic cases "the present" may be the only opportunity for obtaining specimens of real value.

Guiding Principles

The first principle should not need to be accentuated in our profession, but, despite the strictest precautions, bottles of blood for transfusion, cylinders of gas for anaesthesia, not to mention ampoules of drugs for injection, are still confused, with fatal results; and, while it is bad enough to have such a disaster on one's hands when the patient is perhaps unlikely to live in any event, it is even worse that a criminal should escape justice or an innocent man be convicted as the result of carelessness or inaccuracy in a simple procedure. Cases have occurred in which a doctor has been unable to identify his own specimen bottles and slides when confronted with them in the witness-box, and it should be stressed that all samples must be so adequately labelled as to be identifiable to all parties subsequently. Samples should whenever possible be taken in glass containers, and these should be sealed with an adhesive tape such as "selotape." Sealing-wax has largely gone out of fashion because of its uncertain chemical constitution; if used, it should be applied only to the outside of the adhesive tape and not to the lid of the container. Slides can be conveniently transported in small wooden slide-boxes, which again should be sealed with adhesive tape. If such boxes are not available, corrugated brown wrapping-paper, cut to shape, rolled, and sealed, makes a good alternative.

The importance of continuity of identification of specimens is the reason for the second principle. It is convenient, incidentally, to have the receipted list of specimens readily available when giving evidence in court. This may save considerable embarrassment when being questioned on what specimens were actually taken, since it is not always easy to remember under the stress of cross-examination a list of, say, 10 or 12 samples, some of which may not have seemed particularly important when they were obtained.

With regard to the third principle, while an attempt will be made to point out the material which should be collected on the spot, it must be remembered that there are rarely two homicides completely alike, and that it is better to take too many specimens rather than too few. In particular, beware of the police officer who says, "I'm not keen on all this scientific stuff, Doctor. I want straightforward facts to put before the jury which they will understand." He will ring you up a week later to tell you that his superintendent or the Director of Public Prosecutions now wishes to have a sample of X or Y or a photograph of bruise Z. In this connexion it is worth stressing that the doctor should never hesitate (for fear his original thoroughness be doubted) to have a second or third look at a body. It is surprising how bruises and abrasions show up or fall into a pattern once a body has been exsanguinated by post-mortem exami-

nation. Similarly, in cases of alleged rape bruises which are not apparent at examination shortly after the incident may come up during the next 24 hours, and be easily seen if the patient is examined again.

In forensic cases it is essential to have permission from the person concerned (and from his or her guardian if the person is under 21), not only before any specimens are collected but before any examination other than simple observation is made. This permission should be obtained in writing.

The chief problems which will concern the general practitioner, or more particularly the police surgeon, are those associated with the examination of motorists alleged to be under the influence of alcohol or drugs (Section 15 of the Road Traffic Act), cases of rape, buggery, and assault. While the investigations in these cases will naturally differ according to whether the person is alive or dead, it is convenient to consider them in relation to the nature of the charge.

Tests for Alcohol

The clinical examination of the allegedly alcoholic motorist is outside the scope of this article, but in certain county constabularies requests for samples of blood and urine for analysis for alcohol content are becoming more frequent. The importance of obtaining permission before taking such specimens must once again be underlined. The motorist need not subject himself to such examination, but refusal frequently goes against him in subsequent proceedings.

If the police want these tests done they should provide the receptacles for the specimens. In the case of blood alcohols it is most important that the skin should not be cleansed with any material containing alcohol, and the same applies to the syringe. Soap and water are generally considered the best cleansing agents for the skin in these cases, and an 8-ml. oxylated "venule" should be used to collect the blood. It is not the custom in this country to use fluoride in the venule to prevent fermentation, therefore the venule should be either refrigerated or transported immediately to the police laboratory, where it may be divided into two or three equal parts—one to be available to the defence. The speed of transport in this as in any other forensic case is of course the responsibility of the police. Urine should be collected in a clean bottle and filled to the top if possible. In no case should the urine occupy less than one-third of the bottle. The police commonly supply 4- or 6-oz. (100- or 150-ml.) bottles.

Blood alcohols are sometimes of value after death, and may explain circumstances which otherwise would be inexplicable, as in certain traffic accidents and street fights. The blood should be taken from limb veins and not from the heart, as it has been shown that alcohol from a loaded stomach may contaminate the heart blood after death. These samples should, of course, again be taken into containers which have had no contact with alcohol. Again, as a general principle, the amount of blood taken should not occupy less than one-third of the container.

Sexual Assault

The examination of clothing in cases of alleged rape is, generally speaking, the responsibility of the police laboratories. This does not mean to say that the ordinary powers of observation should not be exercised with regard to the

distribution of tears, blood-stains, and stains of semen. The local police force can be expected to provide suitable containers in which the clothing can be placed and which can be sealed. It will be remembered that to substantiate a charge of rape it is not necessary to show complete penetration. Indeed, it has been held in court that the presence of semen within the labia minora is proof of penetration within the meaning of the law. It is therefore important to make a detailed examination of the vulva and vagina—initially swabs should be taken from within the labia and carefully labelled; afterwards they should be taken from higher up the vaginal canal. Under optimum conditions a speculum may be used, but satisfactory smears can generally be obtained without this, on an ordinary throat swab. It has been found, however, that spermatozoa deteriorate fairly rapidly on cotton-wool and it is best to make an immediate smear on a glass slide from the swab and hand both swab and smear to the officer in charge of the case.

In cases of rape, blood-grouping may be necessary, and blood should be taken both in citrate and as whole blood. While citrated blood is more readily available for immediate examination, whole blood is preferable if there is likely to be any delay in the transport of the specimen. In any case of delay the blood specimen should be stored in a refrigerator at a temperature of between 4 and 6° C., but it should not be frozen. While a few drops of blood are, of course, enough for most groupings, it is always advisable to have material to spare, and when practicable 1 ml. or more of blood should be collected and half of it placed in 3.8% sodium citrate solution (four volumes of blood to one of citrate). The blood should be taken into chemically clean bottles, preferably sterile. Samples of pubic hair are also of importance, and as these samples should contain the hair root it is better to pluck the hairs at the end of the examination lest the patient's co-operation be lost at an early stage. The post-mortem examination of cases of suspected rape will be conducted along similar lines but in considerably easier circumstances.

The collection of specimens in cases of buggery will closely follow those described above, but here it is even more important that anal swabs should be immediately smeared on to glass slides and any material of a lubricating nature, such as petroleum jelly or paraffin, should be carefully looked for and preserved. The splashing of semen in the perianal region should also be looked for, and a damp swab will often be sufficient to remove an adequate sample of semen from this region.

Assault

Here the forensic duty of the doctor lies mainly along the lines of detailed and accurate observation of wounds, and it is perhaps only necessary to underline the importance of removing where possible and preserving any foreign bodies such as fragments of glass or metal which may remain in these wounds. To constitute a wound in law the whole skin or mucous membrane must be broken. An abrasion is not sufficient. Paint, metal, or glass adherent to or driven into the body should be preserved. In the majority of these cases it is important to take blood for grouping.

Traffic Accidents

The possibility of contact traces of vehicles in "hit and run" traffic accidents should be remembered. Whether the victim be alive or dead any extraneous fragments of paint, metal, glass, or fibres found adherent to the body or its clothing should be preserved in small bottles or tubes, and, more particularly if the victim is dead, samples of blood and hair taken for comparison with material subsequently found on a suspected vehicle. The preservation of skin showing the imprint of a tyre or radiator is a difficult problem owing to the shrinkage which occurs on removing the skin from the body, quite apart from artifacts and deformities resulting from fixation. Photography is a much more satisfactory method of recording such injuries for future

comparison. This applies to any injury involving skin, and the photograph should include a scale to avoid dimensional errors.

Homicide

The material that should be preserved in the case of homicide will naturally vary from case to case, but generally speaking the following samples should be collected: hair, both head and pubic; blood, a large enough sample for both grouping and alcohol estimation; finger-nail scrapings; stomach contents; urine; vaginal and anal swabs; and saliva.

Hairs.—Hairs should always be plucked to include a sample of root, and placed in small well-stoppered bottles or tubes. Envelopes may be used in emergency; but hair is better confined and more easily seen in a glass container.

Blood.—The precautions necessary in the taking of blood for alcohol analysis and blood grouping have already been explained. Blood taken for carbon-monoxide estimation should always fill the container—a 4-ml. screw-capped bottle is entirely adequate. The amount of carbon monoxide lost to the air above the surface of the blood in a partially filled bottle, particularly if it is shaken in transit, may easily amount to 25% of the original content.

Finger-nail Scrapings.—These are generally collected after death. They may be taken by clipping the nails into separate glass tubes or by using sharpened matchsticks to remove the debris from beneath the nails. The latter is considered more effective. Ten matches should be sharpened and two sets of five small glass tubes strapped together with adhesive tape, and labelled "left" and "right" and 1 to 5.

Stomach Contents.—Quite apart from the question of poisoning, the stomach contents should be retained in all cases of homicide, as they are occasionally of value in estimating the time of death. The stomach, having been tied at the cardiac and duodenal ends before removal from the body, should be opened over a wide-mouthed glass container (chemically clean), and after immediate and necessarily superficial examination it should be added to the contents and the container closed by means of a non-metal cap or stopper.

Urine.—This can generally be conveniently collected by manual compression of the bladder into a sterile container. All the urine should be preserved.

Material for Chemical Analysis

In cases of suspected poisoning it is necessary to collect virtually the whole of the intestinal tract with its contents, the liver, the kidneys, a large sample of hair, a sample of bone, and urine. Chemically clean containers should be obtained from the police. The stomach, the small intestine, and the large intestine should be tied off separately and their contents emptied into separate containers before examination of the mucosa. The hair should be plucked, and a long bone removed intact (to avoid contamination with a metal saw). As large a sample of blood as can conveniently be obtained (up to a pint or more—600 ml.) may be of great value in the detection of certain drugs which are not specifically absorbed by solid organs. For instance, the presence of aspirin, the barbiturates, and anti-histaminic drugs may often be determined much more easily in a large sample of blood than in any solid organ. In cases of suspected murder by poisoning each organ or type of material should be placed in a separate container.

In post-mortem examinations for coroners in cases of suspected suicide or accidental death, it is generally sufficient to place the solid organs in one container and the organs containing fluids each in separate containers.

In cases of exhumation, samples of soil above, at the side, and below the coffin should be taken separately. The identification of the chemical structure of the coffin and its nails is of course not the responsibility of the doctor.

A copy of the medical practitioner's findings should accompany (or follow as soon as possible) the specimens

to the police laboratory. Generally speaking it is not the duty of the medical practitioner to act in the role of the policeman, but, on the other hand, it is perhaps a waste of time to have taken trouble in the collection of specimens without indicating to the police scientists (who are not usually medically qualified) the reasons for which the specimens were taken. It is therefore reasonable for the medical practitioner to indicate what lines of investigation he thinks necessary on the material he has provided.

In conclusion, it is necessary to stress once again that, unless the samples which have been taken are properly labelled and sealed and delivered with celerity and safety, the trouble and care devoted to their collection will be completely wasted and valueless.

Next article on Clinical Pathology.—"Urine Testing in the Surgery," by Dr. H. E. Archer.

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BRITISH ORTHOPAEDIC ASSOCIATION ANNUAL MEETING

The annual meeting of the British Orthopaedic Association was held at the Queen Elizabeth Hospital, Birmingham, on October 23 and 24. Sir Reginald Watson-Jones was in the chair on the first day, and on the second day he was succeeded by the new president, Professor Bryan McFarland. Clinical meetings were held at the Royal Orthopaedic Hospital, Birmingham, the Birmingham Accident Hospital, and the Rehabilitation Workshop of Austin's factory, and as a new feature an instructional course in orthopaedic surgery was given on the day before the meeting.

Sir REGINALD WATSON-JONES, in his presidential address, reviewed the progress and development of the British Orthopaedic Association. It had created firm ties between the orthopaedic surgeons of Great Britain, the Commonwealth countries, and the United States of America. The British Orthopaedic Association had given strong support to the foundation of the New Zealand Orthopaedic Association and the South African Orthopaedic Association, and, with equal generosity from the United States and Canada, it had secured the foundation of Travelling Fellowships for young orthopaedic surgeons between the United States, Canada, and Britain, with a share by other countries of the Commonwealth.

Mindful of the value of tradition, the association had recently taken steps to stimulate interest in historical treasures relating to orthopaedic and allied subjects. A collection of such treasures had been started, and it would be housed at the Royal College of Surgeons of England, where a selection would always be on view in the College Hall. Among the items of special interest were the percussion hammer used by Hugh Owen Thomas, his flute, his smoking-cap, and the signet ring with which he used to seal the collar-and-cuff slings so that they would not be removed without his knowledge before the next visit.

Judet Arthroplasty

Mr. D. LE VAY (London) gave an account of his experience of replacement arthroplasty with a Judet-type prosthesis as the primary treatment of sub-capital fractures of the neck of the femur. He thought that the method was well justified in the elderly. Most patients had been allowed up 4-5 weeks after the operation and the average length of stay in hospital was 10 weeks. Although there had been a tendency for the head to migrate into a varus position a point of stability was reached beyond which no further displacement occurred.

Mr. O. J. VAUGHAN-JACKSON (London) recalled that at a clinical demonstration at the combined meeting of the orthopaedic associations of the English-speaking world in 1952 he had shown elderly patients with fractures of the neck of the femur treated primarily by replacement arthroplasty. Though privately optimistic, he had at that time adopted a cautious attitude. A further year's observation of these patients and of others in his total series of 34 cases had confirmed him in his optimism, but it was still too early to make a final assessment of the merits of the operation. Its limitation was that at best it did not give a normal joint, which was not true of a successful nailing operation: it could therefore not be recommended for all patients with femoral neck fractures—certainly not for those in their fifties or sixties. Nevertheless he believed that it could be recommended for the really aged, for it avoided the uncertainties of the nailing operation, with the likelihood that a high proportion of patients treated by nailing would require further operative treatment later. Of his 34 cases, the operation was tolerated well in 32 and poorly in 1; 1 patient died. The main local complication was fracture of the prosthesis, which occurred in 4 cases; the use of metal prostheses in place of plastic would probably solve the problem of breakage. Walking was resumed 5-6 weeks after operation. Most patients preferred to use sticks for at least six months, but none complained of severe pain.

Mr. G. N. GOLDEN (Guildford) reported 60 cases of Judet arthroplasty for fracture which he had reviewed in collaboration with Mr. C. C. M. MURRAY (Southsea) and Mr. A. G. ORD (Portsmouth). The results were good in 70% and satisfactory in a further 15%. He agreed that the operation offered advantages over nailing in the aged. Mr. K. H. PRIDIE (Bristol) condemned the operation of primary Judet arthroplasty for fractured femoral neck. In 57% of cases in which treatment was by nailing the hip was indistinguishable from normal. Avascular necrosis was inevitable in 11%, but this was balanced by a 12% incidence of fractured acrylic prosthesis. Judet arthroplasty should be reserved for the treatment of fractures in which nailing had proved unsatisfactory. Dr. J. T. SCALES (Stanmore) said that further work was required on the properties of materials used for internal appliances. Plastics were liable to heat deterioration, but metals were also liable to defects resulting from stress.

Mr. G. K. ROSE (Shrewsbury) spoke on the problem of the "valgus" or "pronated" foot. The dividing line between normal and abnormal was ill-defined, and the indications for treatment and for its cessation were indefinite. He had therefore undertaken a long-term investigation of the feet of 177 children aged between 6 and 8 years. His conclusions were that some valgus shift was normal, but that there was no difference in this between boys and girls. The essential pathological feature in the abnormal valgus foot was strain of the peritalar joint, not simply an abnormal position of the joint.

Causes of Coccydynia

Mr. H. J. RICHARDS (Oswestry) reviewed the possible causes of coccydynia in the light of a study of 102 cases. A history of injury was present in less than half the cases. Infection and neoplasm were occasional causes, but could not explain the majority. Psychogenic factors were secondary rather than primary. He believed that in many cases coccydynia was caused by a central prolapse of one of the lower lumbar intervertebral disks. He supported this hypothesis on theoretical grounds and by clinical observation. Thus 40 out of 1,000 patients diagnosed as having a disk protrusion complained of coccydynia in association with sciatic pain; and nearly half of the patients with coccydynia had low backache or sciatica to begin with and most of the remainder later developed similar symptoms.

Mr. K. I. NISSEN (London) expressed strong disagreement with this hypothesis. In his experience relief from coccydynia could nearly always be assured by repeated manipulation of the coccyx; excision might be necessary in 5-10% of cases. He could not accept the argument that prolapse