Hospital Topics

The needle necropsy

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Abstract

The technique of limited necropsy by histological examination of needle tissue cores obtained percutaneously is indicated when a full necropsy is not justified owing to the risk of infection or when tissue for special investigations is needed soon after death without recourse to full necropsy facilities. The method is ideal for detecting conditions producing diffuse changes in an organ. Because the cadaver is preserved essentially intact relatives who refuse permission for a standard necropsy might consent to a needle necropsy if this option is offered to them.

Introduction

Despite continuing doubts and controversy,[1] the necropsy clearly has a vital part to play in clinical practice.[2 3] Unfortunately, for various reasons the standard necropsy technique may be inadvisable or inappropriate in a few cases. A full necropsy is contraindicated if there is a risk of hepatitis virus B infection,[4] although the availability of a vaccine may alter this recommendation. Histological and other studies may be hampered by autolysis if there is an unacceptable delay between death and the availability of full necropsy facilities.

We report on five consecutive cases in which the necropsy was initially or exclusively confined to histological examination of tissue cores obtained percutaneously with Tru-Cut (Travenol Laboratories, Deerfield, Illinois, USA) needles. Although percutaneous needle biopsy is a well established investigative procedure in other areas of clinical medicine, there have been no previous reports of its use in necropsy. The indications, advantages, and limitations of the technique are analysed.

Method

In all cases tissue cores were obtained percutaneously with Tru-Cut needles; one needle usually sufficed for each necropsy. A small (<5 mm long) skin incision was made over the appropriate organ or lesion and the Tru-Cut needle inserted with the obturator retracted to cover the specimen notch. On contact with the organ or lesion to be sampled the obturator was advanced followed by the cannula. The needle was withdrawn and the tissue core removed. Usually this procedure was repeated several times to obtain enough cores. If there was a risk of infection from hepatitis virus B the procedure was carried out through skin liberally soaked with 3% glutaraldehyde; a cottonwool pad and a firm adhesive dressing was used to cover the skin incision. If ascites was present leakage of fluid was minimised by closing the skin incision with sutures. Tissue cores were fixed in 10% formolsaline and routinely processed and stained for histology.

Case reports

CASE 1

A 56 year old man with chronic obstructive airways disease and systemic lupus erythematosus developed systemic herpes simplex virus infection. The infection responded to treatment with acyclovir, but he developed gastric erosions and died of gastrointestinal haemorrhage. During the previous six years minor increases in serum transaminase and alkaline phosphatase activity had been noted but their importance was uncertain.

Necropsy was limited to histology of the skin and percutaneous needle samples of liver, kidney, spleen, and myocardium. The liver showed fatty change, periportal fibrosis, and many large periportal intracytoplasmic globules, which were diastase resistant and periodic acid Schiff positive (fig 1); these were shown to contain α_1-antitrypsin by immunoperoxidase staining. Examination of serum subsequently showed the rare SS homozygous phenotype and low α_1-antitrypsin activity (1·2 g/l). The kidney showed diffuse segmental mesangial cell proliferation with thickening of the glomerular capillary loops. Electron microscopy showed subendothelial and paramesangial electron dense deposits, and immunoperoxidase staining showed the presence of IgG, IgM, and C3 in a similar distribution. The appearance was considered to be that of a membranoproliferative

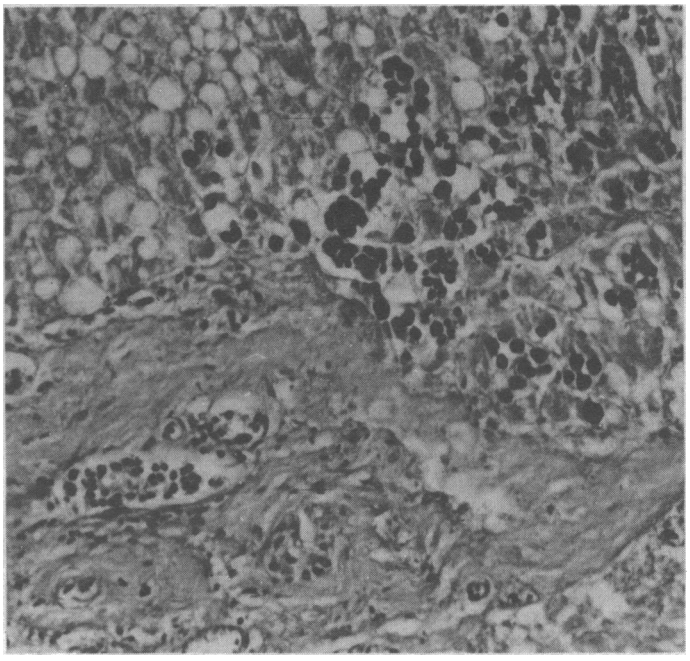

FIG 1—Periportal α_1-antitrypsin inclusions and fatty change in liver (diastase/periodic acid Schiff × 400).

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glomerulonephritis known to be associated with both systemic lupus erythematosus and α_1-antitrypsin deficiency. The lungs showed bronchopneumonia and the heart and spleen were normal. The skin showed a small vessel leucocytoclastic vasculitis with IgG, IgM, C3, and fibrin on immunofluorescent examination.

CASE 2

A 64 year old woman gave a short history of dyspnoea and chest pain. Radiological examination showed opacities in the right lung. Pneumonia was diagnosed and treatment started with tetracycline. During the next three months, however, respiratory impairment increased and signs of renal failure appeared. Renal biopsy showed crescentic glomerulonephritis and the diagnosis was considered to be Wegener's granulomatosis or polyarteritis nodosa. Treatment was started with steroids and cyclophosphamide but the patient died in respiratory failure.

After consent had been given a needle necropsy was immediately performed to ensure well preserved tissue. Tissue cores of lung, liver, and kidney were obtained. Examination of the lung tissue showed extensive aspergillus infection (fig 2) but no evidence of Wegener's granulomatosis or arteritis. The kidney showed a degree of fibrosis in the crescents, which previously contained fibrin. Electron microscopy showed subendothelial and paramesangial electron dense deposits; immunoperoxidase studies showed the presence of IgG, IgM, and C3 in a similar distribution. The appearance was reclassified as immune complex crescentic glomerulonephritis.

A subsequent conventional necropsy showed a small gastric ulcer, but otherwise the findings were identical to those of the needle necropsy.

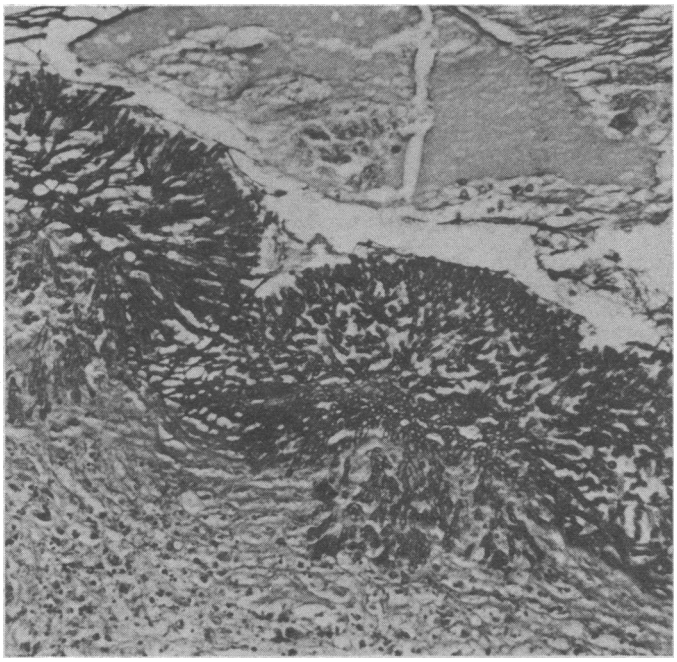

FIG 2—Aspergillus hyphae infiltrating lung (periodic acid Schiff × 200).

CASE 3

A 75 year old man, with mild diabetes, was admitted to hospital with acute retention of urine; this was attributed to benign prostatic enlargement. On investigation biochemical evidence of liver disease was found and he was also noted to be positive for hepatitis B surface antigen (HBsAg). He died before surgical treatment for his prostatic disease was undertaken. A full necropsy was requested, but this was not carried out because of the hepatitis virus B infection.

A needle necropsy was performed within 24 hours of death through skin swabbed with glutaraldehyde. Tissue cores of liver, lungs, kidney, myocardium, and prostate (by the perineal route) were obtained. The liver showed a macronodular cirrhosis with a few HBsAg positive cells on immunoperoxidase staining. The liver also showed many small intracytoplasmic globules in periportal and periseptal hepatocytes which were diastase resistant and periodic acid Schiff positive. Examination of stored serum taken during life showed an MZ α_1-antitrypsin phenotype.

The prostate was hyperplastic. The other organs showed no abnormal features apart from mild hypertensive changes in the kidney.

CASE 4

A 20 year old man with myeloid leukaemia, for which he had received cytotoxic treatment, developed a severe chest infection. Despite intensive treatment with antibiotics and antifungal agents he died in respiratory failure. Because the donor of an emergency white cell transfusion was later found to be HBsAg positive a conventional necropsy was contraindicated.

A needle necropsy was performed 36 hours after death through skin swabbed with glutaraldehyde; cores of liver, lung, myocardium, and kidney were obtained. The lung showed consolidation in all areas sampled with infiltration by a branching septate fungus consistent with *Aspergillus* spp. Fungal hyphae were also seen in the liver. The kidney and myocardium showed no abnormal features.

CASE 5

A 74 year old man who presented with digital gangrene of the left first, second, and third toes and the left fourth finger was found to have spontaneous platelet aggregation. Investigation failed to show a predisposing cause and the diagnosis was considered to be idiopathic intravascular platelet aggregation. Surgical amputation of the gangrenous digits was performed and treatment started with aspirin and dipyridamole. Ischaemic areas continued to develop in other fingers and treatment was therefore altered to warfarin. Nevertheless, extensive cutaneous gangrene developed in the abdominal wall; his condition rapidly deteriorated and he died.

Death occurred at 5 30 pm on a Saturday and consent for necropsy was obtained that evening. Because extensive tissue autolysis would have been present by the following Monday a needle necropsy was performed in a ward side room 30 minutes after certification. Tissue cores of lung, heart, liver, spleen, and kidney were obtained and a sample of skin was taken. Histology showed organising thrombi in the smaller vessels of the renal cortex and cardiac muscle. The lungs showed bronchopneumonia and pulmonary oedema. The spleen and liver were normal. Ultrastructural examination of the skin showed platelet and fibrin deposition in the dermal vessels.

No additional features of importance were identified in a conventional necropsy on the following Monday.

Discussion

In each of these five cases, constituting our experience of the needle necropsy, important information was obtained by rigorous examination of needle tissue cores. Indeed, an interesting aspect of the needle necropsy is that the small tissue samples tended to be more carefully scrutinised than the larger samples from a conventional necropsy; a wider range of techniques and stains was applied to obtain as much information as possible out of a very limited sample. It is possible that α_1-antitrypsin deficiency would have been overlooked in cases 1 and 2 if a conventional necropsy had been done.

Important indications for performing a needle necropsy are a serious danger of infection by hepatitis virus B (as in cases 3 and 4) and a need to obtain tissue soon after death for special studies such as immunohistochemistry and electron microscopy (as in cases 1, 2, and 5). A debatable indication is for clinically interesting cases in which relatives of the deceased have refused to give their consent for a conventional necropsy; the option of a less disfiguring needle necropsy might be offered as a more acceptable alternative. There is a possibility, however, of an undesirable decline in the number of conventional necropsies if this option became generally known to relatives. A major advantage of the needle necropsy is speed, and with consent it is technically possible to start the procedure soon after death; this minimises autolysis and permits a wide range of investi-

gative methods including microbiological and immunological studies, frozen sections,[5] and electron microscopy.[6] Tissue for establishing cell cultures could also be obtained in this way. Although not performed in the present cases, bone marrow examination could be undertaken by trephine techniques. The main disadvantage is the unsuitability of the needle necropsy for small organs—for example, parathyroid glands—or lesions—for example, micrometastases. Nevertheless, in our series of five unselected consecutive needle necropsies important findings emerged from all cases. The relatively high incidence of α_1-antitrypsin deficiency in this small series was probably fortuitous.

We consider that in selected cases needle necropsy is a useful adjunct or alternative to the conventional post mortem examination.

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MATERIA NON MEDICA

The Yeti scalp

The supposed scalp of a Yeti can be seen at the monastery of Pangboche, three miles nearer Everest than Thyangboche. The monastery lies at the tree line and the scenery is rugged, with excellent views of the Everest massif and Amai Dablang and other peaks. Trekkers need to take a detour some hundreds of feet up the hillside to reach the monastery, which, like many in Nepal, is in a state of neglect.

The wooden gate hangs precariously on its hinges and the courtyard is deserted and untidy. A flight of plain wooden stairs leads to a low, dark upper room with small, unglazed windows, which appears to be a form of sanctuary containing models, figures, and other religious ornaments.

The lama who acted as curator did not speak English but on payment of a few rupees opened a plain wooden box which contained the Yeti scalp and the remains of a forearm, also supposed to be that of a Yeti.

Scepticism was challenged by the appearance of the scalp which was of obvious animal origin and shaped like a helmet, being approximately 10 in tall and a little more at the base in the sagittal plane. The hair was chestnut and mostly had the consistency of fine bristle. In the midline from front to back there was a raphe with a centre parting, and immediately on each side of this the hair was very short and might have been cropped. On the temples the consistency was finer and the hair longer. There were bald patches on the leathery surface, indicating that the scalp was of some considerable age, and at the periphery wedge-shaped deficiencies suggested previous "biopsies." On one side there were some small holes about the size of a ·22 calibre bullet, or a little larger, which also raised questions.

The helmet shape would not fit any animal prominence that readily comes to mind and there were certainly no seams underneath to suggest that it was an artefact.

It may be that the origin of this scalp and its shape have been satisfactorily explained by experts, but it was worth the extra climb to see it.—R TILSTON AUSTIN, consultant orthopaedic surgeon, Leicester.

Fungus foray, tangling with truffles

As an amateur mycologist (of the macroscopic kind), I, and my family, wander the woods in autumn collecting fungi—to be rewarded over the next few days by the culinary delights of cooking and eating them.

Each year we try some new exotic species but usually agree that there is little to beat the chanterelle, the cep, and the field mushroom. As a precaution I have the phone number of the King's Liver Unit, and have recently been in correspondence with the intrepid Dr P Bastien, who lives in the Vosges in France and who has put his treatment of poisoning by the "Death Cap" (*Amanita phalloides*) to the test on television. He ate several, took his cure, and (we were assured) was none the worse.

I believe that the finding of the truffle (*Tuber aestivum*) is the acme of success in fungus searching. Accordingly we determined to try to unearth some, unaided by hound or pig, a task which the relevant textbooks describe as being extremely unlikely to succeed.

We set off armed with small forks and trowels into a likely looking wood in the Wiltshire uplands not far from the place where the last official truffle hunter retired in the 1930s. We probed in the leaf mould in various places for some hours; at one point my wife smelt a strange unpleasant smell and moved hurriedly on for fear of finding something nasty. Eventually one of our party dug up four or five round brown objects rather like small potatoes and while she was digging we noted that smell easily discernible above ground and indicating where she should dig further. The car was filled with this strange aroma on the journey home.

As the test subject I consumed a lamb stew containing the ? truffles, for not all were convinced that we had the real thing. They darkened on cooking, lost their characteristic odour, and were crunchy to eat. I imagined that the stew tasted better for their presence, but they seem to have no flavour of their own. I suffered no ill effects and there was general agreement that they were indeed truffles.

Another search will be made shortly, after which we shall try other ways of preparing them for they are so highly esteemed and fetch such an enormous price abroad. My wife assures me she will be able to find them again by scent, for what she hurried past before was the precious fungus. I shan't need to train a truffle hound after all.—G S CROCKETT, retired consultant physician, Dorset.

Seventy five years on—with a smile and a song

Although, like many others, my youth was shaped by the scout movement, I never managed to visit Brownsea Island in Poole Harbour, where in August 1907 its nidation may be said to have occurred. The seventy fifth anniversary of that momentous camp provided a sufficient excuse.

Our first journey from Studland by canoe might have pleased the movement's founder. My elder son, a cub scout "sixer," and I approached the island from southwards out of a cool swirl of late morning mist. We closed the shore near the site of the first camp and crawled up a high bank of damp and slippery clay, emerging through some bracken into the midst of a girl guide camp. The partially packed luggage of the camp was all about and "Captain," a lady with a glass shattering voice, was declaiming on the subject of "wet tentage." We made our way stealthily to the Baden-Powell stone, which I was pleased to see, was carved from a piece of my native island of Portland. A little later we returned to Studland through the murk against the wind and current, but well pleased with our short visit.

My younger son, a recent cub scout recruit, needed a little persuasion to encourage him to undertake the three mile journey and to forfeit time on the sands at Studland. Once in the canoe, however, he was soon infected by the sense of occasion, and by the time we approached Brownsea in the light haze of the hot summer afternoon we were an invading task force.

He crawled expertly up the now dry clay bank and, wearing only bathing shorts, burst bravely out between the gorse bushes at the top. There was an "electric" moment: we were surrounded by exquisite peafowl on the close-cropped turf of a clearing in the bracken. Like Tennyson's lotus eaters we found ourselves in "A land/In which it seemèd always afternoon." I do not remember the walk up to the B-P stone this time—just being there in what must be one of the most beautiful of campsites, and looking out over the waters of Poole Harbour to the Purbeck Hills in the grey blue distance. We shared a moment together in adventureland, which emerges—if you are lucky—soon after fairyland has disappeared and—if you are very lucky indeed—never quite disappears.—D GREEN, research pharmacologist, Berkshire.