Suppuration of the thyroid occurs as a secondary phenomenon, the primary focus being most commonly in the upper respiratory tract.³ The commonest infecting organisms are streptococci, staphylococci, and pneumococci.⁴ Gram-negative bacilli rarely cause thyroiditis. In our patient the urinary tract was the probable primary focus of infection. Interestingly, the infecting organism was found in the functional nodule of the thyroid. Although the pathogenesis of this phenomenon is not clear, in acute thyroiditis the infection tends to develop in pre-existing lesions, particularly adenomas.⁴

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Safety cabinet for use in laboratory studies on hazardous infectious diseases

Patients with highly infectious diseases such as Lassa fever have large amounts of virus in their blood during the acute clinical phase. Virus may also be present in their urine, cerebrospinal fluid, and throat and other secretions. Tests on specimens of these fluids are thus potentially lethal procedures, which most clinical laboratories cannot safely undertake. Nevertheless, tests may be essential to aid diagnosis and guide treatment.

To reduce the risk of infection inactivation by heat (60°C for 60 minutes) has been considered. This, however, may not always destroy all infectivity, cannot be used on samples for bacteriological or haematological study, and changes unpredictably the concentrations of some serum constituents¹. We have therefore rejected heat inactivation of plasma as not reliable enough for routine use; furthermore, the thermal stability of a new agent may not even have been examined. The safest procedure for handling dangerously infectious specimens is to contain all such material at all times within a safety cabinet. Even laboratories that would rely on heat inactivation need a cabinet for bacteriology, haematology, and the separation of plasma and serum. I describe here a slightly larger cabinet that accommodates the few additional instruments necessary for most common clinical biochemical measurements.

Description

The cabinet is an aseptic type² and consists of a welded aluminium box about 200 × 90 × 60 cm with an extension at one end for the microscope (see figure). At the other end is a gas-tight door and a liquid disinfectant-filled lock (dunk tank) through which sealed containers may be passed. The windows are of 6-mm Perspex. A sparkproof fan draws about 5.7 m³ (200 cu ft) of air/min through the cabinet, giving about 440 air changes an hour. The inlet and the outlet air is filtered through absolute glass-fibre

Safety cabinet with gloves removed to show interior more clearly.

paper filters that prevent the escape of infectious particles even at low airflows (when some types of filter are inefficient³), so that in the event of a power or fan failure the cabinet remains sealed. The cabinet was tested by the internal release of an aerosol containing 35.3×10^6 1- μ m particles/m³ (10^6 1- μ m particles/cu ft) of a tracer organism and the application of a slit sampler to all possible sites of leakage. No leaks were detected with the fan either on or off.

The instruments inside were chosen for their safety, ease of use and decontamination, and reliable function after periods of inactivity. They include a microscope; a spectrophotometer with a pour-in suck-out cell and a digital display (making it easy to operate with gloves on and to read at a distance); a small incubator; and two centrifuges, one for separating 1–5-ml volumes of plasma and serum, and a microhaematocrit centrifuge (potentially a dangerous aerosol generator⁴). With these instruments routine bacteriology and haematology and a range of biochemical procedures such as plasma sugar and urea estimations and liver function tests may be carried out. Sodium and potassium may be measured by means of an unenclosed flame photometer in plasma diluted in a suitable sterilising fluid in the cabinet and passed out through the dunk tank.

Conclusion

This cabinet and the instruments within it are safe to use and easy to operate. Only existing reliable and well-tried techniques have been incorporated, partly for convenience and partly to avoid isolating too much expensive equipment that may be relatively underemployed. The cabinet has been used for haematological and biochemical investigations on blood samples from a colleague who was accidentally infected with the agent of a Marburg-like haemorrhagic fever (results to be published later).

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