which the effectiveness of oxygen treatment has not been properly assessed.

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For Debate . . .

The changing face of the laboratory

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Medicine as a science has a rapidly changing scenario as ideas and methods of approach to the treatment of disease wax and wane. Divisions of medicine grow or decline in stature, their popularity reflected in their ability to influence investment in the specialty. Pathology laboratories had their heyday in the 'sixties, as much owing to the impressive contribution to medical care made by pathologists during the previous decade as to advances in technology. Laboratory diagnosis was based on an expert appraisal of mostly qualitative results by a knowledgeable specialist—who, perhaps, had time to delve into each patient's case history and to discuss the laboratory results with clinical colleagues. As a result of these deliberations, the pathologist offered a subjective judgment about the diagnosis. With advancing technology and objective methods of analysis his role is diminishing, and the many vacant posts, which may never be filled,[1] coupled with an aging population point to an impending crisis.

Why use a laboratory?

Worse is to come. Many acute general hospitals now have intensive care units, coronary care units, and operating theatres where continuous monitoring facilities are provided—for example, for cardiac and lung function. Why, the clinicians ask, do we have to send samples to the laboratory, when we could have machines to monitor blood gases, electrolytes, blood glucose, and urea? Paediatricians ask similar questions, knowing that the cost to the State of one brain-damaged infant could be as much as £250 000.

Reliable and easily operated diagnostic kits are now available for determining some biochemical values; they can be installed in wards for more effective control of patients' treatment. Might there soon be no need to rely on a pathology service?

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Specialist surgeons wish to examine their biopsy specimens during the operation—say, in a convenient side room. Why should they have to send them to someone else? They could reduce operating time, become more expert in assessing where and how much to remove, and aid the training of their juniors.

Laboratory test results are now precise and scientific and are largely generated by automated testing systems. Analysis can be objective, though it is rarely undertaken by a pathologist—perhaps in no more than 5% of all requests. The rapid expansion in knowledge, the rise in demand for laboratory investigations, and the complexity of equipment and technique are patently too much for any single pathologist to cope with. The modern training curricula of medical students in a high-technology medical school environment enables them to assess laboratory information and draw conclusions without help. In most laboratories the numbers of pathologists have not changed appreciably in 20 years, and increasing reliance has to be placed on other grades of staff, mainly medical laboratory scientists. Some of the latter are expert in very narrow specialties, in which they may be the only people who can advise clinicians. This has led to understandable concern among laboratory medical staff.

Total rethink needed

A total rethinking of the provision of laboratory services is long overdue. Laboratories have become too large and cumbersome. Specimens may have to be processed in one hospital laboratory and then rerouted to a centralised specialist unit, such as a chromatography laboratory sited at another hospital, for actual testing. Centralisation means transport, and transport systems are extremely vulnerable. Some large hospital laboratories have set up satellites on site to handle emergencies. If the demands of acute medicine and surgery cannot be met as they are in the private sector then hospital pathologists will have only themselves to blame for their inadequacy. Clinicians could and should have the results of most investigations the day they request them.

To add to these problems, some pathologists are actively undermining the structural chain of command of medical laboratory scientists instead of reinforcing their own clinical

skill. This is a short-sighted policy because, if pathologists were to take over a functional middle-management administrative role, they would certainly destroy any remaining clinical raison d'être for their discipline.

Many large laboratories are linked through their medical laboratory scientists; and common policies of finance, training, and safety requirements, for example, depend on them, as does the very fabric on which present and future laboratory services depend. Yet the need for the present laboratory system is bound to disappear as technology advances to the stage where direct patient monitoring is possible. In between those two states, the side-room laboratory and factory laboratory must be given room to manoeuvre and develop via a changing clinical need. Medical laboratory science and its exponents will play a primary part in this development. The science of pathology will also change and the royal college and the association should therefore look ahead and develop the clinical role of the pathologist with these prospective changes in mind, rather than turn inwards on the laboratories that support their function. Tomorrow's clinicians will learn to use computers, much as they have learnt to use the telephone. Standard-diagnosis computer programs are already available for some diseases—designed by medical experts of the day.

The way ahead

The way ahead clearly indicates a continuing and increasing need for interpretive advice in the light of projected technological breakthroughs. The alternative for pathologists is a step back into the past that would make it obvious that their clinical role was finished so far as their clinical colleagues were concerned.

If pathologists wish to lead their place must surely be in the front of the laboratory facing the clinician and not buried within the technology. Medical laboratory scientists would want to follow that lead rather than compete for the same job. Sir James Howie, addressing a symposium on automation and computerisation in Stirling last year, indicated that he would look after the "medicine" if medical laboratory scientists would look after the "laboratory" side.

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Lesson of the Week

Fatal streptococcal septicaemia

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In less than one month four cases of acute streptococcal septicaemia presented at our hospitals. All four patients died, two of whom had been perfectly healthy until the onset of septicaemia.

Haemolytic streptococci may still kill previously healthy, young people despite their sensitivity to penicillin

Case reports

Case 1—A woman aged 39 years presented to her general practitioner with a mildly painful and slightly swollen left leg. She was treated with analgesics, but not with antibiotics. The following day she was brought to the hospital as an emergency, but was dead on arrival. At necropsy examination the leg was grossly swollen from knee to thigh and the overlying skin was discoloured with purple blotches, but no breach of the surface could be found. When an incision was made a large amount of watery brown fluid, in which fat globules floated, was released, showing extensive areas of necrotic muscle but no localised abscesses. There were no other abnormalities. β-Haemolytic streptococci group A T/M type 1/1 were grown in abundance from the spleen and the damaged muscle.

Case 2—A 31-year-old ambulance driver was brought to hospital in the early hours of the morning in shock. Six days before that he had cut a finger on his left hand while working on his car. Two days later it had become red and painful, and the following morning he had expressed some fluid from it. The next day he woke "feeling rough" but attributed this to the previous night's party. By evening, however, he felt very ill, developed diarrhoea and vomiting, and his neck swelled up. His throat was sore and a tentative diagnosis of glandular fever was made, and this was treated with aspirin. A rash appeared on his chest the next day and in the night he complained of feeling cold and then collapsed. He had passed no urine for 18 hours. He was deeply shocked on admission, and had a brawny swelling over the neck, left arm, and chest, and the upper part of the left chest appeared bruised. He was treated for septicaemia, and the following day blood cultures grew large numbers of group A streptococci, also T/M type 1/1. Investigations confirmed disseminated intravascular coagulation.

Although his initial response to intensive resuscitation was good, he required ventilation and developed progressive shock lung. He was also started on peritoneal dialysis for renal failure. At the time of admission his peripheral perfusion was extremely

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