

periodic series of induction shocks (regulated by a metronome) applied to the apex of the ventricles." This process partially restored the blood pressure: "The mean pressure is raised from the low point to which it had fallen in consequence of the cardiac standstill: it does not, however, attain the normal height, even though a long series of beats is elicited by the stimulating shocks. This fact is due to the feebleness of the auricular contraction under inhibitory influence. For the auricles beat so feebly (in response to the stimulation) that they are unable to pump their contents into the ventricles in the normal vigorous fashion. The ventricles fill very slowly, and, at the moment of contraction, contain much less blood than in the normal state; hence the amount of blood thrown into the aorta in a given space of time is much diminished, and the arterial pressure fails to attain its ordinary height."

Cardiologists will recognise in this passage a description of some of the underlying physiology of the pacemaker syndrome.<sup>3</sup> The patient may be aware of dizziness, precordial distress, or jugular pulsations. Symptoms are probably caused both by loss of the normal sequence of atrial and ventricular contraction and by activation of atrial stretch receptors causing further reflex changes. The syndrome is most likely to occur if the patient has retrograde ventriculoatrial conduction reversing the normal sequence of contraction.

McWilliam, whose experiments were performed long before electrocardiography appeared, noted this change in the sequence of contraction: "The ventricular contraction precedes the auricular contraction when the exciting shocks are applied to the ventricles."

McWilliam may even have anticipated the haemodynamic benefit of dual chamber pacing<sup>4</sup>: "In order that such excitation should be as effective as possible it is probably best to send the stimulating shocks through the whole heart, so that the auricles come directly under their influence as well as the ventricles." McWilliam truly showed outstanding insight into the subtleties of using pacemakers.

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## Wide variations in surgical mortality

### *Standard definition needed for postoperative mortality*

Surgeons used to be able to bury their mistakes, but not any longer. With the increasing scrutiny of surgical results within hospitals and regions,<sup>1</sup> and in some cases nationally,<sup>2</sup> surgical mortality becomes one of several definable points at which quality may be assessed. It may, however, be a crude index of surgical skill and clinical judgment because many other factors—such as the general condition of the patient, anaesthetic skill, and the quality of postoperative care—will contribute to death after an operation. In an ideal world surgical staff in every hospital should be able to carry out the full repertoire of procedures with similarly low mortality and complication rates, but this is clearly not the case.

Studies in several surgical specialties have shown wide variations in surgical mortality. Specialist urologists achieve a lower mortality and better results than non-specialists,<sup>3,4</sup> and similar data have been presented for operations on abdominal aortic aneurysms.<sup>5</sup> Surgical experience has a crucial effect on the results of operations for oesophageal cancer<sup>6</sup>: in a survey of oesophageal resections reported to the West Midlands Cancer Registry patients operated on by surgeons carrying out three or fewer resections a year had twice the postoperative mortality of the patients of surgeons performing six or more resections a year.<sup>7</sup> Among the 84 surgeons contributing to the large bowel cancer project there was a sixfold variation in the rate of breakdown of the anastomosis with a consequent threefold variation in mortality.<sup>8</sup> West *et al* studied two adjacent counties in the United States and found that patients in one county, who were taken to the nearest hospital offering an emergency service, had a considerably worse outcome than those in the adjacent county, which had a smaller number of defined trauma centres.<sup>9</sup> In England and Wales, where patients are usually taken to the nearest hospital, two thirds of deaths caused by trauma to systems other than the central nervous system were judged preventable.<sup>10</sup> There are many

other examples of differences in surgical mortality, but comparisons are not as easy as they seem: careful case selection and massaging of figures may improve the results of a surgical series.

The first problem is one of definition. There are currently four definitions of postoperative mortality: death within 30, 60, or 90 days of operation and death while still undergoing treatment as an inpatient. In a recent series of patients with colorectal cancer Brown *et al* applied these different definitions and found that the postoperative mortality varied from 7% to 12%.<sup>11</sup> Death within 30 days of the last operation seemed the best definition, including most of the cardio-respiratory deaths related to the operation and excluding most of the deaths from advanced malignancy. The adoption of the 30 day definition in publications and local audit would help allow fair comparisons of quality and excellence.

Other factors also influence mortality. In the confidential inquiry into perioperative deaths more than a fifth of deaths followed operations done as an emergency, and more than 10% of these fatal procedures were judged unnecessary or unjustified—often because the patient had advanced disease or was elderly and frail.<sup>2</sup> In a quarter the inexperience of the surgeon was thought to be important in the patient's death.

An ideal definition of surgical mortality would include only those deaths occurring from the procedure being performed and not those resulting from advanced malignancy. There should be some method of scoring the general condition of the patient taking into account age and cardiorespiratory function, and one such method is the APACHE (acute physiology and chronic health evaluation) score.<sup>12</sup> There are, however, a multiplicity of scoring systems, and Schein has argued for a uniform system for general use.<sup>13</sup> The procedure should be classified as emergency, urgent, scheduled, or elective, and the experience and status of the surgeon should

be noted. Only with such detailed information will fair comparisons be possible.

The real differences in surgical mortality that do exist between surgeons and centres may teach important lessons. One study compared mortality between a teaching hospital and its adjacent district hospital and led to a proper intensive care unit being provided in the district hospital.<sup>14</sup> The confidential inquiry into perioperative deaths emphasised the value of regular reviews of mortality for teaching and training and the importance of organisation.<sup>2</sup> Some types of surgery should undoubtedly be concentrated in fewer hands. The development of management protocols for procedures with a high mortality and the mandatory participation of senior medical and surgical staff is also inevitable.<sup>15</sup>

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## Rediscovering monoamine oxidase inhibitors

### *Benefits underestimated, side effects exaggerated*

Monoamine oxidase inhibitors were introduced 30 years ago but fell from favour because of their alarming interaction with foods containing tyramine<sup>1,2</sup> and their poor performance in a large trial of antidepressants.<sup>3</sup> Now new American studies are causing psychiatrists to re-evaluate this category of drugs.<sup>4,6</sup>

The results of these studies have confirmed earlier findings that the monoamine oxidase inhibitor phenelzine is superior to placebo<sup>7</sup> and imipramine<sup>8</sup> in agoraphobic patients with panic attacks. Most improvement occurs in measures of phobic anxiety and avoidance, but the frequency of the attacks is reduced. This anxiolytic effect does not depend on the patient also having depressive symptoms.<sup>9</sup>

Monoamine oxidase inhibitors are also effective in depression that is not of the classic endogenous type.<sup>4,10</sup> Electroconvulsive therapy may not be effective in these milder forms of depression, and tricyclic antidepressants may be contraindicated. The patient who is likely to respond to monoamine oxidase inhibitors often reports "atypical" features such as mood reactivity (a transient remission from depressed mood in response to positive environmental factors), overeating, oversleeping, extreme fatigue when depressed, and chronic oversensitivity to rejection. Almost three quarters of patients who show mood reactivity and two or more of the other features will respond to phenelzine (45-90 mg daily), whereas only half respond to imipramine (150-300 mg daily)—a response that is not significantly better than placebo.<sup>10</sup> Phenelzine may also produce a good response in patients with panic symptoms, panic attacks, hostility, a self pitying attitude with symptoms of blaming others, irritability, and hypochondriasis<sup>11</sup> and in those with a labile personality, interpersonal sensitivity, and "touchiness."<sup>10</sup>

The efficacy of monoamine oxidase inhibitors in such a wide range of disorders suggests that their actions are not specifically anxiolytic, antiphobic, or antidepressive. This has led Tyrer to conclude that they should be prescribed for agoraphobia, panic episodes, hypochondriasis, irritability, somatic anxiety, and anergia.<sup>12</sup>

Until recently psychiatrists agreed that monoamine oxidase inhibitors do not help patients with neurotic symptoms secondary to a lifelong inadequate personality.<sup>13</sup> But in a recent double blind crossover trial the monoamine oxidase

inhibitor tranylcypromine proved to be better than lorazepam, carbamazepine, trifluoperazine, and placebo in helping patients with borderline personality disorder (characterised by prominent rejection sensitivity and problems with impulse control).<sup>14</sup> There was a clear improvement in mood and a less prominent improvement in abnormal behaviour. A subgroup of patients with borderline personality may have features of atypical depression and thus respond preferentially to a monoamine oxidase inhibitor. These findings require replication.

Many physicians and general practitioners do not prescribe monoamine oxidase inhibitors because they doubt their safety. The drugs have anticholinergic side effects such as mild sedation, dry mouth, blurred vision, difficulty with micturition, and ejaculatory failure, but these are generally less severe than those produced by tricyclic antidepressants and should not be a deterrent to prescribing.<sup>15</sup> The main fears about the interaction of monoamine oxidase inhibitors with tyramine in foodstuffs have been grossly exaggerated.<sup>16,17</sup> At the height of their use only 17 cases of interaction with food were reported in 10 years. Between January 1975 and December 1983 tranylcypromine was prescribed in 98 000 patient years. Patients should be told, however, to avoid those foods that interact with the drugs—for example, cheese and yeast and beef extracts—and patients should always be given a card to say that they are taking the drugs. Of the monoamine oxidase inhibitors available, tranylcypromine has the greatest propensity to produce these interactions and phenelzine the least. Occasional cases of addiction with tolerance occur, especially with tranylcypromine, and withdrawal symptoms (headache, shivering, paraesthesia, and nightmares) may develop within days after stopping phenelzine and isocarboxazid.<sup>18</sup> For this reason gradual reduction in dosage is the best form of withdrawal.

Monoamine oxidase inhibitors are thus effective in patients with phobic disorders and in those with non-endogenous depression accompanied by somatic anxiety (including panic symptoms) and atypical features. The decision to prescribe the drugs should depend, however, not only on the symptoms but also on factors such as the duration of the illness, the response to previous drugs and other treatments, the patient's