and electroencephalographic responses to similar blood alcohol concentrations are strikingly similar in identical twins but less so in non-identical pairs.[19] Observations such as these seem unlikely, however, to be relevant to the pathogenesis of the dependence syndrome. A clue may have come from the results of a recent study[20] in which alcohol was given to young men who had an alcoholic parent and to a control group without such a family history: the first group had higher concentrations of acetaldehyde in the blood than did the controls—an important finding, since acetaldehyde has been postulated as a substrate in the formation of potentially addictive tetrahydroisoquinolines.

Environmental factors must play some part in determining whether a person becomes alcoholic, but they may not be apparent in adoption and twin studies conducted within a particular community. Indeed, the adoptive parents have usually been middle class with stable backgrounds, and hence the variety of environmental influences acting on the adopted children is likely to have been restricted. Furthermore, adopted children would probably be more at risk of becoming alcoholic in France than in, say, Saudi Arabia; and, the steady increase in alcohol consumption and alcohol-related problems in most Western countries in recent years is not likely to have a genetic basis. Simply because his family history suggests that someone is predisposed to become an alcoholic is no justification for selective counselling, which in isolation is unlikely to modify his alcohol intake. A more broadly based publicity programme designed to convince the man (and woman) in the street of the dangers of excessive drinking seems a better alternative.


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# Kidneys and computers

An attendance of over 150 at a meeting last month on computers for renal units suggests that many working in nephrology are wondering if computers are not of more practical value than the almost complete lack of publications on the topic might suggest. Doctors in renal units initially turned to computers over ten years ago to calculate survival statistics and to match donated organs for transplantations. The current surge of interest reflects the success of treating end-stage renal failure as clinicians are faced with ever-more information on the many patients being kept alive by dialysis and transplantation.

Typically, these patients in renal failure have many investigations, which need to be evaluated in the context of previous results and appropriate decisions made. Most renal physicians and transplant surgeons will admit to having made costly mistakes owing to their delay in perceiving the importance of changes in the results of routine investigations. A change that is clinically significant for an individual patient may not necessarily always be large enough to move results out of the normal range. The great difficulties of defining "normal" ranges were emphasised at the Nottingham meeting by Professor Brian Morgan, of Leeds, who spoke on monitoring renal function. He underlined the need to compare information about the patient with earlier results from that patient: whenever possible graphs should be used to plot sequential results.

The demonstration attracting most attention at the meeting was the software package developed by Professor Hugh de Wardener and the Charing Cross Hospital group and presented by minicomputer hardware which can fit into a corner of any renal unit—and perhaps should. Using this combination, the data lost by most renal units deep in the voluminous notes of an average patient appear at the press of a button to be displayed in seconds as the graphs so strongly recommended by Professor Morgan. On a simple instruction the graph can be transferred to the logarithm or the reciprocal, which should certainly be routine for most haematological investigations and measurements of renal function, but such graphs too rarely get drawn because of lack of time. This versatile software package was programmed by the Charing Cross group over more than half a decade. The Newcastle unit has been using the university's main-frame computer and the Canterbury unit has been using a minicomputer; both now have considerable experience of computer help on a daily basis. The Charing Cross system was successfully transferred to Nottingham six months ago and seems equally popular in both units. Other programs remain in the centres that developed them; the real test of acceptability comes when a program is adopted elsewhere. A program in use in Manchester predicts when an individual patient is likely to need dialysis or transplantation; others in Canterbury do simple but important tasks such as stocktaking and other management tasks; and in Oxford a small desk computer is in regular use for compiling annual returns, survival statistics, and similar tasks. In Exeter details of dialysis schedules are planned by computer for individual patients, and this is claimed to reduce morbidity. Like the Charing Cross programs, these would all be immediately welcome in almost any unit, since their relevance to day-to-day work is plain.

Another development which computing permits and was lucidly described by Professor Adrian Smith, of Nottingham, is the regular use of detailed, complex statistical analyses. A computer performs complicated calculations in microseconds, allowing the use of statistical methods not yet in general use in medicine. At Nottingham the department of mathematical statistics is now developing statistical programs with the renal unit. One of these programs has been applied to sequential plasma creatinine results and has been shown to detect important changes of function in transplanted kidneys in a standardised way and at an earlier time than achieved by an experienced clinician. These programs have considerable promise for use both as early-warning systems and for evaluating the effect of changes in treatment. On-line statistical analyses should soon be able to be performed by a computer already on line to accept results direct from the laboratory.

The immediate problem is integrating these contributions, which have been developed using several different computer languages on different computers. As much compatibility as practicable should also be sought by computer planners with the centralised systems run by UK Transplant and the European Dialysis and Transplantation Association to calculate national and European statistics; and they should also take account of the need to include potential new developments. In realistic terms, however, many of those attending left the meeting with one thought: how to get the money to buy a computer for their unit now—and not wait for the long-heralded economic recovery.

# Metal allergy: A false alarm?

Metal implants in surgery became routine only after the major problems of electrolytic corrosion had been recognised and overcome.[1] Though the cobalt-chrome alloys, stainless steels, and other metals since used are largely inert in the body, they do all ionise slightly and small amounts can be found in the adjacent tissues.[2-4] Furthermore, whenever there is friction between metal surfaces or between metal and bone relatively large quantities of the metal are shed, and traces appear in the blood, urine, and hair.[5] Dermatologists have long recognised allergic responses from contact between the skin and nickel, cobalt, and chromium—all important constituents of many surgical implants.

Patch testing of the skin has shown cell-mediated delayed sensitivity to any one of these metals in up to 6·9% of the population,[6] though the figure varies considerably from district to district. When patients with metal implants are tested in this way they show an increased prevalence of metal sensitivity.[7 8] Conversion from a negative to a positive response to patch testing may occur after a hip arthroplasty.[9] The recent use of more sensitive laboratory tests for sensitivity such as the lymphocyte-transformation technique[10 11] or the measurement of the release of leucocyte inhibition factor[12] has confirmed these observations and shown that an even higher proportion of the population is metal sensitive. In one study, for example, 18 out of 32 patients with isolated bone screws were metal sensitive.[12] The highest incidence of all—over two out of three—has been found in patients with loose but uninfected metal-to-metal hip prostheses,[7 8 10 11 13 14] though one survey flatly contradicted these findings.[15] These are the patients receiving the largest dose of the potential allergen from their implants.

Does this induced hypersensitivity matter? Indeed, does the implantation of a metal allergen into an already sensitive patient have the unwelcome clinical effects that might be expected? There have been only a handful of well-documented circumstantial accounts of generalised allergic responses in patients with orthopaedic implants,[12 16-20] in whom symptoms were relieved by removing the metal, only to return on its reapplication to the skin. This evidence has been criticised,[21] but even if accepted at face value the number of such reports is exceedingly small in comparison with the many thousands of implants in use. In clinical practice allergic dermatitis is so protean in its causes and capricious in its response to treatment that no firm conclusion is possible on the risks of a generalised reaction to implanted metal.

Might allergy be a possible explanation[13] of local inflammation around an implant and of its loosening in bone? The evidence in favour is the well-established correlation of metal sensitivity with loose joint prostheses, but the alternative explanation is that the loosening causes the allergy. On the allergy theory, a local allergic vasculitis causes bone death; against that is the fact that the metal in a joint prosthesis will usually be insulated from the bone by a layer of non-allergenic acrylic cement. In one case endarteritis attributed to cobalt sensitivity was a feature in the tissues surrounding the necrotic and fibrosed muscle next to a chrome-cobalt plate on an ulna, yet a similar plate on the adjacent radius showed no "rejection" at all.[22] Low-grade inflammation is not uncommon around bone plates and has usually been attributed to either the irritant effects of corrosion products or to infection, even if cultures prove sterile. In another case a patient with confirmed skin sensitivity to nickel needed a prosthetic heart valve.[23] Testing with subcutaneous samples of the nickel-containing steel produced no general or local response, and none followed the later insertion of the valve.

The evidence for local allergic response is inconclusive, and unless it becomes stronger the verdict must be "Not guilty." Many patients who have received metal implants will acquire metal sensitivity, but in very few will the sensitivity cause clinically important complications. The chances of an adverse reaction are too remote to justify special alarm or precautions.


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