of problems, including crime, unemployment, racial justice, and human rights.

Controversy about alcoholism

Perhaps only slightly less heated was the recent controversy over the treatment of alcoholism, a condition affecting between nine and 15 million Americans, ranking among the chief causes of death, and costing society billions of dollars. Complete abstinence has long been the accepted treatment and the mainstay of Alcoholics Anonymous programmes. But in June of this year a report from the Rand Corporation, while not advocating that treated alcoholics should attempt normal drinking, noted that a substantial number have stabilised at what could be regarded as normal drinking levels. The report, supported by a grant from the National Institutes on Alcohol Abuse and Alcoholism, and based on a study of outcomes for persons treated in NIAAA-supported comprehensive alcoholism centres, found that while 70% of patients were improved, only relatively few were long-term abstainers; and in fact at 18 months there were roughly equal numbers of abstainers, periodic drinkers, and normal drinkers.

The authors were not mistaken in predicting that their findings "may be controversial in some quarters"; and the report was variously called a cruel hoax, dangerous, irresponsible,

a disservice to society, more mischievous than worthy, clinically unsubstantiated, and methodologically unsound, with predictions that thousands will drink themselves to death. Some thought the study ignored the problem of physiological addiction; and some advocated withholding funds from this kind of research. Others, however, felt that the press had mishandled the report, that the reaction was largely emotional, and that repressing scientific data would have been unacceptable. Meanwhile, another study, this time from the Addiction Research Foundation in Toronto, added more fuel to the fire by also suggesting that some alcoholics could be helped by programmes stressing moderate drinking as the ultimate goal; so the last word on this issue remains to be written.

In conclusion, I refer to one more operation, unnecessary though trichological. It was reported from northwest Indiana that at least seven women shaved off their hair after a telephone call from a prankster who claimed to be a doctor at the local hospital. He told each woman that her husband had been admitted with convulsions caused by infectious disease, and that she should immediately shave off her hair to prevent further spread of the contagion. The hair was to be put in plastic bags and left for "someone from the lab" to pick up. It appears that no one from the lab ever came, and that the ladies, being beyond the help of conventional trichology, will have to be referred to the section of artificial organs.

Occasional Review

Use of cardiac pacemakers in Britain

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Summary

In Britain during 1975 cardiac pacemakers were implanted at the rate of 56 new patients per million population. This is about one-third the rate for other Western countries but still represents an increase of 150% since 1972. Six-thousand generators were used, and apparatus worth about £2m was implanted. Over 90% of the initial implantations were by the transvenous route, and the mortality from this operation was only 0.3%. Electrode repositioning was needed in 10% of cases. The average age of patients at the time of first implantation was 70. Most patients with pacemakers were able to obtain driving licences and insurance; only 10% had to pay an additional premium. There is no evidence from insurance companies that such patients have an increased risk of accidents. Patients who wished to undertake paid employment almost always did so, often in their previous job. About 80% of the patients were able to increase or

maintain their leisure activities at the same level of effort as before pacing became necessary. The number of implantations may be expected to increase by about three times over the next five years.

Introduction

This paper compares the present and past statistics in Britain with regard to cardiac pacemaking and also reports on some social aspects. Data are included from surveys of major pacing centres and from all manufacturers (or their agents) who sold pacemakers in Britain in 1975; more-detailed results from the Guy's Hospital series (600 patients) are used to supplement this information whenever possible.

Generators used in Britain

From 1 January to 31 December 1975 some 6000 generators were implanted either as an initial procedure or as a replacement. This is a 20% increase over 1974, when 5000 generators were used, which in turn was a 43% increase over 1973, when 3500 were used. During 1975, 67% of the implanted generators were of the demand type; the corresponding figure for 1974 was 70%, and for 1973 65%. Long-life lithium-iodide-powered pacemakers were used occasionally in 1974 but accounted for slightly less than 5% of all generators sold during 1975.

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The total cost of the generators used in 1975 was about £1 840 000, with a further £126 400 for electrodes, giving an approximate total cost of £2m for the implanted equipment alone.

Method of implantation

There was a definite preference for the initial implantation to be carried out with a transvenous electrode, and over 90% of patients were treated this way during 1973, 1974, and 1975 (the figures for all Britain were 90%, 92%, and 91%, and for Guy's Hospital 97%, 95%, and 91%).

The reasons why some patients were treated with epicardial systems are not available for the whole country, but analysis of the Guy's Hospital series shows that epicardial electrodes were attached to the heart as a method of choice in 30 patients (5%) with heart block who were undergoing cardiac surgery for reasons such as aortic stenosis, but they were not otherwise used for the initial implant. In 24 patients (4%) the transvenous system initially implanted became unsatisfactory (unstable electrode 2%, high threshold 0.4%, and infection or rejection 1.6%), and epicardial systems were eventually used. Thus 9% of the patients were eventually treated with epicardial electrodes.

During 1974, in 80% of the patients treated here the initial implantation could be carried out through one or other cephalic vein, so that the generator could be implanted through the same incision used to approach the vein. An external jugular vein was used in 12% of the patients, and an internal jugular vein in the final 8% after attempts to use both cephalic veins had failed.

Patients

The number of patients receiving initial implants in Britain during each of the three years (fig 1) corresponds during 1975 to 56 patients per million population, an increase from 39/million in 1973. The mean ages of these patients were: 1973, men 66.1 and women 68.7; 1974, men 68.5 and women 69.4; and 1975, men 69.0 and women 69.1.

FIG 1—Numbers of patients receiving initial implant in Britain during 1973-5.

Complications reported during the period were few, so the figures for the three years have been combined (table I).

TABLE I—Overall British complication rates (1973-75)

	Death within 48 hours (%)	Electrode repositioning (%)	Infection or necrosis or both within three months (%)
First implant	0.32	10.1	2.3
Generator replacement	0.26	3.1	3.4

Generator performance

Nearly all the generators implanted were powered by mercury cells, and the returns from manufacturers indicated that most were supplied by Devices Ltd, although the actual market percentages cannot be

reported for commercial reasons. The present performance of mercury-powered generators is similar for apparatus produced by most manufacturers, and the January 1976 data for Devices units are given in fig 2. Three years after implantation 69% of the demand generators and 85% of the fixed-rate generators continued to function normally.

FIG 2—Actuarial curves showing percentage of implanted Devices generators continuing to function normally with time. Generators replaced electively while still functioning have been excluded from date of replacement. Data are based on 100% follow-up from nine British hospitals and refer to 1056 type 2970s and 2006 type 3821s at implantation.

Generators powered by lithium-iodide batteries were introduced only a few years ago, and in Britain during 1975 4.9% of generators implanted were of this type. Most were produced by Teletronics, Cardiac Pacemakers Inc, or Devices Ltd.

During the survey period the Department of Health and Social Security trials of the British Harwell/AWRE/Devices isotope-powered pacemaker were under way, and by 31 December 1975 76 of these units had been implanted. The trials were carried out in four centres: Guy's Hospital, London; Groby Road Hospital, Leicester; Royal Infirmary, Glasgow; and University Hospital of Wales, Cardiff. These generators use the mark 3 ISOGEN battery with an AWRE DC-DC converter and standard Devices circuitry. The potential longevity is 20-30 years (table II).

TABLE II—British ²³⁸Pu generators, mark 3 series

	Fixed-rate	Demand
No	24	52
Longest implant	31 months	29 months
Mean follow-up	20.9 months	19.1 months

Six of these generators have been removed for reasons such as the death of the patient or infection and after testing have been resterilised and implanted in other patients. There have been no failures of the ISOGEN battery, although one generator that was working when removed from a patient was found on return to Harwell to have a fractured thermopile. The mean age of patients receiving the ISOGEN-powered generator was slightly over 50.

Social effects of pacing

In 1976 Guy's Hospital posted a questionnaire to 111 patients with pacemakers aged 65 or less asking about their employment, leisure activity, and ability to obtain driving licences and motor insurance. We received 88 (79%) replies. We also received information from 16 motor insurance companies about their experience with and terms offered to patients with pacemakers.

EMPLOYMENT

Data are available on 60 men and 22 women. Of the men, 53 (88%) were in paid employment, 2 (3.3%) had their employment terminated,

2 (3.3%) retired because of age, 1 (2%) retired early, and 2 (3.3%) were unable to find employment. Of the women, 13 (59%) were in paid employment and 9 (41%), including housewives, were not. Overall, 60 patients (73%) were with the same employers as they were before a pacemaker was needed, and 52 of them (87%) were performing the same job. Six of these 60 (10%) had been given lighter duties but remained in essentially the same job, and 2 (3%) had been found a different job with their original employer. A further six patients had found new jobs with some difficulty (7% of the 82 replies), and 16 were not employed—in three cases owing to retirement. Overall, of the patients who wanted paid employment, all the women and 88% of men were able to obtain work. An implanted pacemaker was felt not to be a disadvantage in obtaining employment by 75% of the women and 62% of the men. A frequent comment was that jobs entailing heavy physical effort or lifting were unsuitable. Only one patient said that he was refused a job (at a bank) because of his pacemaker, and another found that declaring his pacemaker before an interview was disadvantageous, but this was not the case during the interview.

LEISURE ACTIVITIES

About 80% of the patients were able to maintain or increase their level of activity during leisure compared with the period before pacing was needed. There was a tendency for the younger patients to become more active after implantation (table III). Several patients were able to play tennis or golf or to enjoy sailing and hill-walking.

TABLE III—Effect of pacemaker on level of leisure activity in various age groups. Results expressed as percentages of patients

Age in years:	15-20	21-30	31-40	41-50	51-60	61-70
More active	100	80	50	31	6	12
No change			25	50	76	65
Less active		20	25	19	18	23

DRIVING LICENCES

Data are available on 86 patients, of whom 31 (36%) had not requested a licence. Of the 55 who attempted to obtain a licence 52 (94%) were successful. No difficulty had been experienced by 38 (69%), but 14 (25%) reported delays. Only one patient (included in the 38) did not disclose his pacemaker. One patient stopped driving voluntarily after having a pacemaker implanted, and two (4%) were refused licences after examination by the licensing authority. One patient was unable to renew his heavy goods vehicle licence but was granted a normal licence.

MOTOR INSURANCE

Sixteen companies provided data, and in total they insure some 10 million drivers. None had any knowledge of a claim involving someone with a pacemaker. In every case they require the pacemaker to be declared, both to the insurance company and to the licensing authority. Nine (56%) require an annual certificate from a cardiologist supporting the patient's application for insurance. Ten companies (63%) offer normal terms subject to a satisfactory medical report, two offer only restricted cover, and four impose an extra premium.

Of the 52 patients who obtained motor insurance 46 (88%) had no problems, five (10%) obtained cover with difficulty, and one did not declare his pacemaker. An additional premium of about 25% was paid by five patients (10%).

The insurance companies held different views about their likely action in the event of a claim involving a patient who had not disclosed his pacemaker. Without exception they confirmed that this would be adequate grounds for completely repudiating liability, but only six (37%) would probably do so. Seven companies (44%) would accept liability despite non-disclosure if the circumstances of the claim were not related to the pacemaker or if the patient's circumstances and medical condition would not have attracted an additional premium in any case. Three companies (19%) felt it was extremely unlikely they would ever exercise the option to repudiate liability.

Discussion

The number of initial implantations of cardiac pacemakers has almost trebled since 1972, when the British figure was 22/million population. This is in keeping with the experience in many other countries, although it should be noted that the present 1975 British figure is still only about half the rate for Sweden and West Germany in 1972. The most recent figures, covering 1975, show rates of 270/million for the USA, 178/million for Sweden, and 110/million for Canada. Our immediate European neighbours West Germany, France, and the Netherlands have implantation rates of 190/million, 140/million, and 125/million respectively. The British figure of 56/million is comparable with the rate in Hungary (60/million) and appreciably lower than those in Spain and Portugal (75/million) and Denmark (74/million).¹ It appears that the trend in Britain is closely similar to that in other Western countries but that it is about five years behind.

The patients who actually receive cardiac pacemakers in Britain are similar in age distribution to reported series from other countries. Although the mean age is about 70, there are still many patients with congenital heart block, cardiomyopathy, surgically induced or associated block, or idiopathic fibrosis at an early age. It is extremely unlikely that the incidence of conduction system fibrosis is uniquely low in Britain, and there is no reason to believe that physicians in all other Western countries are incorrect in their indications for pacing. Hence probably many patients in Britain who could benefit from a pacemaker are not receiving one.

The present results indicate a considerable reduction in complications of pacing from improvements in both apparatus and technique. A previous survey² disclosed an infection rate about twice as high as at present, and failure of pacing was due to high threshold in 20% of cases—almost certainly reflecting poor technique in electrode placement. The operative mortality for transvenous implants is widely reported as about 1%,^{3 4} and the British figure of 0.3% is well in keeping.

The symptomatic improvement with pacing is well recognised, and there is some evidence of improvement in mental performance.⁵ The present findings emphasise the ability of patients with pacemakers to earn their living, drive cars safely, and enjoy their leisure. The increasing use of generators that function for many years may be expected to reduce the number of hospital admissions, and improving reliability will simplify follow-up procedures. Clearly the pattern of the past few years indicates continuing increases in new implantations, probably reaching a level in Britain about three times as high as at present within five years.

I am very grateful to all the pacing centres and also to the manufacturers and agents who often went to considerable trouble to obtain and return questionnaires. The figures for longevity of Devices pacemakers were kindly supplied by the following hospitals: St George's Hospital, London; Royal Victoria Hospital, Belfast; Sully Hospital, Sully; Harefield Hospital, Harefield; Victoria Hospital, Blackpool; the Royal Infirmary of Edinburgh; St Bartholomew's Hospital, London; and Southampton Western Hospital, Southampton. I am grateful for permission to reproduce them. The information concerning the ISOGEN plutonium units is presented by permission of the DHSS, Harwell, and the Atomic Weapons Research Establishment, and I am grateful to Dr W Lees and Dr A W Penn, of Harwell. I also thank the patients who provided information and the insurance companies.

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