New Devices

Alarms or despondency?

G E LANGLEY

In a residential home or hospital ward an elderly, confused, and restless patient can cause problems. If he leaves the site inadvertently he may be unable to find his way back and, in consequence, be at risk on roads or from exposure to the elements. Anxieties arising from a sense of responsibility felt by staff can, in turn, lead to overreaction—for instance, by locking doors by overrecourse to sedation with the attendant risks of falls and further mental impairment. Adequate staffing and appropriate architecture can go a long way in minimising risks but to contain the problem solely by these means is for many a counsel of perfection.

The continuous surveillance of 30 confused, elderly patients combined with all the other tasks required of staff is a continual burden and anxiety. If an incident occurs considerable time can be used in the search for, and retrieval of, a resident. The actual time absorbed in this way may vary from, say, the relatively brief period of 2-3 minutes devoted to bringing a patient back from a corridor, to the deployment of 20 or 30 staff searching grounds for protracted periods in inclement weather and at unsocial hours, failure sometimes ending in the coroner's court. At Exe Vale Hospital a river, canal, trunk roads, and marshes are all adjacent.

Use of alarms

One approach to the problem is to supplement normal nursing procedures by providing an alarm at appropriate exits. Such exits will be used by many more people than those at risk, and an unselective alarm that operates with every passage will inevitably promote a tendency to cry wolf. The alarm, therefore, needs to be selective for those at risk while remaining unresponsive to others who may use the same exit—for example, other residents, staff, visitors, etc. A device that meets these criteria is the TAG alarm system made by Tag Radionics Ltd.

Apparatus

The static apparatus comprises an alarm tag worn by the patient, with transmitters and sensors at the exit, a control box near by, and a conveniently sited signal/cancel alarm unit.

The device worn is housed in a light plastic container 4 cm × 7 cm (fig 1), tapered at the attachment end. About half the space is taken up with electronic equipment and the rest with an attachment clip that can be removed only with a special jig. Smaller devices are being developed. Each tag contains a battery with a life of five years and is then expendable.

When this device is passed between transmitting and receiving aerials displayed above and at the side of a door (fig 2), the alarm is triggered by the control apparatus, a buzzer sounds, and a light appears on a centrally sited display panel from whence the alarm is manually cancelled. Each door is protected by a separate alarm and display lamp. The apparatus used covered a range of three metres, but it is possible to cover greater distances.

FIG 1—Intact and laundered tags.

No procedure likely to occur in clinical practice screened the device—for instance, close body contact—and in demonstration it was virtually impossible to pass it through an exit without the alarm sounding.

High background radiation may occasionally cause false-positive alarms, but there is no interference with other medical electronic apparatus, particularly cardiac pacemakers. Nevertheless, it is advised that the transmitting aerial should be placed above a door so that any patient who collapses to the floor moves away from it. The alarm is not activated by the hospital's staff location system.*

ATTACHMENT TO THE PATIENT

It would be unacceptable to subjects, relatives, and staff alike if residents were asked to wear obvious and inelegant devices that set them apart from others. In practice tags could be located in the pockets of jackets or trousers, under a collar (if at the back out of sight is out of mind), under a cardigan, or attached to skirt or trouser belts. They are lighter and smaller than a Medresco hearing aid and there is no unsightly wire (fig 3).

INSTALLATION

The apparatus was installed at the Hallett Clinic, Exe Vale Hospital, Exeter—a 28-bed joint assessment unit serving the confused elderly in the Exeter Health Care District.

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There were two exits at either end of a long narrow ward, the corridor immediately outside the main exit bifurcating and thus making surveillance even more difficult. This bifurcation entailed the installation of three alarm stations for two doors. In each case, to avoid inadvertent operation of the device by patients just inside the door, the alarm was situated some 5-10 m beyond the door.

FIG 2—Static apparatus.

APPARATUS IN USE

Incidents continued over a period of 31 weeks, during which the alarm was inactive for 15 weeks. Statistical analysis significantly favoured the alarm in its aim of preventing time-consuming and risky incidents. Details are available from the author.

Acceptability, staff attitudes, and experiences

No complaints were received from relatives. In the early days some patients worried at the fixing pin and some tags became detached, but this problem was rectified by redesigning the pin and using a more unobtrusive location for the tag, preferably out of reach. Some of the later pins sheared or bent in use. Location at the back of a collar, although unobtrusive, was sometimes uncomfortable when leaning backwards in a chair. Two patients who initially rejected the tag later found it acceptable. It is useful if the attachment button, 2 cm in diameter, is visible even if the rest of the device is concealed as it provides a visible reminder that the tag is in place (fig 3). The alarm is inactivated if the clothing bearing the tag is removed so there is an obvious advantage in attaching the tag to a belt or inside the pocket of either a skirt or trousers.

Although tags are relatively inexpensive, keeping trace of them and preventing damage is an important part of their acceptability to both clinicians and treasurers. No harm came to any tag from physical damage or contact with urine. Three tags were *x*-rayed and remained active; five, attached to clothing, were laundered with fatal or near fatal results to the electronics (fig 1). Laundered tags should be discarded.

From the outset the staff found the device a practical and useful aid in their duties. Towards the end of the trial, the ward sister summed up her impressions by saying: "It has not only reduced the time that we have had to spend off the ward looking for patients, but we can now turn our minds to other things knowing that the alarm is behind us, the patients get more of our time when we are actually on the ward. We have fewer anxieties about patients being exposed to danger."

Some anecdotes further illustrate the point. One patient, whose wandering was controlled at the Hallett Clinic by the use of the alarm, immediately became a problem on transfer to another ward where no alarm was fitted.

Shortly after completion of the formal trial the clinic moved to new accommodation. There was some delay in resiting the alarm, patients absconded, and staff anxiously awaited its reinstatement. On occasions, doors had to be locked.

Cost effectiveness

The most extreme cost of a patient leaving a ward without permission may be life itself. Lesser, but nevertheless appreciable, costs are incurred in the search procedures designed to avoid the problems outlined in the introduction. It is not easy to express these costs in financial terms, but a local estimate of an average two-hour search by hospital staff by day is £100 without allowance for disruption to other work. By night the cost is greater. At Exe Vale Hospital searches can occur at monthly intervals and may be quite taxing on the good will and co-operation of the staff. Three or four times a year the police may have to be called in as well. There is thus a definable cost to the NHS of at least £1200-1500 a year, plus police costs, with a much greater undefinable cost in terms of distress and anxiety.

Against this it costs £1400-1700 to provide equipment for an average-width door with additional installation costs of £500. Tags cost £5 each (renewable every five years), and the annual maintenance cost is roughly £90-120. The apparatus itself has a life span of 10-15 years and tags five years unless damaged. In the first year the cost for one door and 16 tags could be £2200 with a subsequent approximate annual cost of £170 for maintenance and replacing lost tags. This sum, at Exe Vale Hospital, is comparable with the cost of searches for one year with savings in subsequent years to the extent that searches are avoided.

Expressing the cost over a conservative 10-year life of the apparatus for 25 patients and one door would cost 30p per patient a week.

Discussion

Whatever the numerical evidence that exists in favour of a procedure, there is also the final test of whether people, in practice, vote with their feet. The tag apparatus has now been permanently installed at the Hallett Clinic and is a much valued aid. The staff look forward to further developments in the design of the attachment worn by patients, perhaps with a range of shapes available for different locations, or some minor decoration on the button. Experience in the use of the tag also needs to be broadened to include confused patients living in other conditions or other high-risk groups of patients in hospital. The nature of wandering and restlessness together with the factors that influence this behaviour could also be usefully explored.

In the early days some anxiety was expressed that an alarm would undercut good nursing practices but, in the event, by reducing both anxiety and the unproductive time spent in retrieving patients and returning them to the ward, nursing standards were raised. It is important to preserve the dignity of the individual which, in this case, was achieved by the unobtrusive nature of the device, by not facing him with a locked door, by returning him to the ward by the personal intervention of nurses known to him, and by the debate about return, if any, occurring immediately outside the ward out of sight of most patients but before danger had occurred. Most patients came

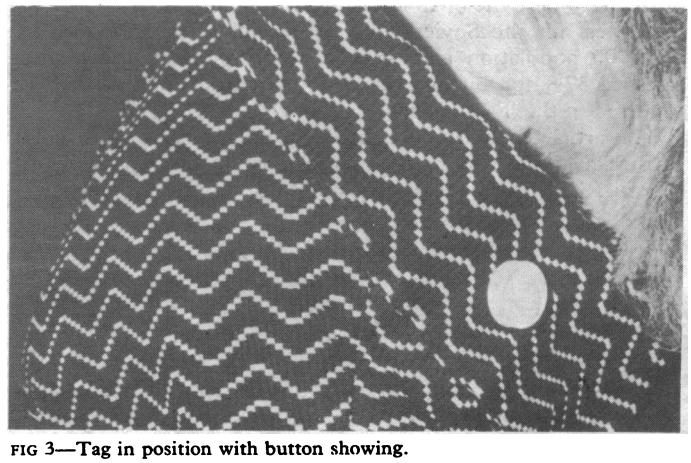

FIG 3—Tag in position with button showing.

back with persuasion. Where there were persistent and clear-cut demands to leave the hospital, civil rights were protected by appropriate use of the Mental Health Act.

Being selective, the device does not mean there is an all-seeing monitor such as CCTV, and there is the added advantage that no one has constantly to monitor a receiving screen. Some staff training is required so that nurses understand the attachment procedures, and *x*-ray and laundry staff are warned to watch for tags inadvertently leaving the ward.

The final test is whether people on the spot are convinced in practice and that is certainly so at the Hallett Clinic.

I am grateful to the following people at Exe Vale Hospital: Charge nurses S Braunton and R Adams, Sister Julie Bloom, and the nursing staff of the Hallett Clinic for their work with the patients and on the ratings; the engineering staff for help with the installation; Dr N N Bayatti for some of the analyses; Mrs Gill Meredith for typing the script and rating scales; and Mr Jack Brummitt, radiographer, for some of the photographs. I thank Mr Heinz Wolff of the Clinical Research Centre, Northwick Park Hospital (division of bioengineering), for his interest and for putting me in touch with Mr Karl Grossfield of the National Research Development Corporation, and Mr Sydney Pocock of the CRC, Northwick Park Hospital (division of bioengineering), who conducted the early engineering appraisal and advised on the most appropriate apparatus and its application in the hospital setting; Mr John Falck and Mr Geoff Pawsey of Tag Radionics Limited for the loan and installation of equipment; and Mr M Harman, inventor, and Commander Dr Rowe of the Rehabilitation and Medical Research Trust. Although they did not, in the end, supply the apparatus, their support was an important encouragement at a difficult period in the venture.

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USSR Letter

The anti-abortion campaign

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Early in September this year the Soviet Government announced a package of measures relating to social security payments and maternity leave.[1] Leaving aside the improvements in pensions (for old age, invalidity, and loss of the family breadwinner), these changes should be interpreted not so much as a move to alleviate family poverty but as one element in a developing demographic strategy. For some years now, official concern has been mounting over the low birth rates and rates of natural increase in European republics of the Union, a situation that is made more disturbing for the authorities by high levels of population growth in Soviet Central Asia, where predominantly Moslem traditions persist.

The current pronatalist policy also finds expression in propaganda levelled against abortion, which is widely resorted to as a form of family planning. For an indication of the broad approach and arguments deployed in the campaign it is helpful to turn to an article in the popular scientific journal *Nauki i Tekhnika* (*Science and Technology*).[2] As it happens, this journal is published in Latvia, where the birth rate and natural increase in 1979 were the lowest for the Soviet Union; they stood at 13·7 and 1·0 per 1000 population and may be compared with the highest rates of 37·8 for births and 30·1 for natural increase, which occurred in the Tadzhik republic

The article in question consists of an interview with a Dr K B Seglenietse, who holds a senior post at the Medical Institute in Riga. The title poses a question: "Induced abortion—is it murder by the skilled?", which might signal an attempt to identify the ethical implications and dilemmas confronting a doctor in this matter. The text, however, shows no interest in professional self-scrutiny; it is important for what one expert has to say about policies to combat the population crisis.

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Should abortion be banned?

Since 1955 women in all parts of the Soviet Union have enjoyed the right to abortion on demand, provided that the fetus has not reached viability, which is currently defined as around 1000 g. So Dr Seglenietse had no difficulty in dismissing a question that echoed the article's title; having referred to the legal position she made the tart comment: "to accuse women of murder when they are having an abortion is mere affectation."

More important from the viewpoint of policy analysis was her response to the interviewer's statement: "Some people recommend that abortion should be prohibited and contraceptive devices withdrawn from sale." In her reply the doctor cites what is evidently regarded as the deterrent example of Rumania.

The facts of recent population politics in that country are briefly as follows. In 1957 the Government legalised abortion with the object of curtailing the activity of backstreet abortionists and enhancing the health of mothers. By 1965 abortion had become the predominant method of birth control, despite widespread advocacy of contraceptives. The birth rate had fallen from 24·2 to 14·3 per 1000 population. Then in 1966 a law was passed authorising abortions only for women over 45, those with four or more children, those whose life and health were endangered by pregnancy (in the judgment of a medical commission), and for cases involving incest, rape, and mental subnormality. Fiscal measures such as family allowances were also used as collateral aids. Initially the birth rate responded with a sharp increase, but then fell back again as the pattern of small families became re-established.