SHORT REPORT

A novel system of electronic tagging in patients with dementia and wandering

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Abstract

Background: wandering is a common problem in people with dementia. Current methods of physical or chemical restraint have serious adverse effects. Previous attempts at electronic tagging have been unsuccessful because of inadequacy of the technology.

Methods: this study tested equipment, derived from prisoner tagging systems, in three different scenarios: for 4 weeks in two wards at a large teaching hospital, 6 months in a medium sized residential home and 8 weeks in clients' own homes in the community. In the hospital setting five clients, in the residential home four clients and in the community three clients wore an electronic bracelet for the duration of the study.

Results and conclusions: the system proved very reliable and two incidences of external wandering were successfully detected. Compliance was excellent. Ethical issues regarding the tagging of confused elderly people were raised by professional organisations but were not considered a contra-indication by the relatives, clients and staff.

Keywords: electronic tagging, aged, dementia

Introduction

There are approximately 600,000 people with dementia in the UK. At some stage during their illness many wander, putting themselves at risk and presenting challenges to carers and institutional staff. Electronic tagging has the potential to improve client safety and reduce carer stress although previous attempts have failed because of inadequacy in the technology [1]. This paper describes the installation and early results of a novel system for electronic tagging of clients which is derived from prisoner tagging systems. As this equipment has been extensively tested in prisoner tagging systems many of the equipment problems have been resolved. For the elderly with dementia and wandering, the system is appropriate for people living in institutions and a minimal version can also be applied to those living with a relative or carer in the community.

Methods and results

This study tested equipment developed by the same company (Dmatek, Israel) which produces the prisoner tagging systems widely used in Europe. The equipment is of good quality and conforms to all the relevant standards. The client wears a bracelet which is a small radio transmitter. One or more monitoring stations detect the signal from the transmitter which confirms the client’s presence in a zone (Figure 1). The monitoring stations detect when the client leaves a safe area or enters an area of risk and pass this information back to a central base station which is attached to a stand-alone computer. Software on the computer generates a specific warning which is transmitted to a pager, worn by staff (Figure 2). All pager messages include the name and location of the client as well as the cause of the alert. Further monitoring stations, with a much shorter range, are placed beside entrances and exits so the presence of a resident in those areas also generates an alarm on the pager. Residents wearing a bracelet are able to move freely around the facility, or can be restricted to certain zones within that facility. The system can vary the conditions of warning depending on time of day so that, for instance, the resident's presence in the garden may be acceptable during the day but not at night. The advantages of the system are that no permanent wiring is required making it easy to install and it only generates an alarm when wearers of the bracelet approach a pre-defined area of risk.

Ethical approval for the study was given by Riverside Ethical Committee which covers both hospital and community based research. Consent was obtained for most clients from the nearest blood relative involved for their care, usually wife or daughter, although several of the hospital volunteers were able to consent themselves.
A 4-week pilot study on two wards at Charing Cross Hospital, London, in April 2002 identified no problems with the equipment. During this time five volunteer patients wore the bracelet and no episodes of wandering occurred. There was no interference between equipment used on the wards and the tagging equipment.

The electronic monitoring system was then installed in a local residential home with 39 residents in September 2002. The residential home is three stories high and has three fire escapes with concrete stairs linking the ground, 1st and 2nd floor. The residents are located on the 1st and 2nd floors of the building. The intention was to allow the residents to wander freely on their own floor but to alarm if they entered the fire escapes or tried to leave via the front door. A total of nine zone monitors were installed: two short range on each fire escape entrance door on the 1st and 2nd floors; two longer range on the corridors and one short range beside the main entrance. Four residents wore the bracelet throughout the study which is still ongoing.

There were two episodes where a resident wandered outside the building and both these incidents were immediately detected by the system. On average 15 internal wandering events are detected daily where a client wanders into an ‘at risk’ area. No wandering events have been missed by the system.

There have been a few false alarms due to the bracelet losing contact with the skin for a period of greater than 60 seconds, usually due to the resident falling asleep with their arm in an unusual position.

The bracelet is specially constructed so as to require two hands for its removal. Only one resident managed to remove the bracelet and this was successfully detected as an alert by the system.

An equivalent system, using one bracelet, one pager and one monitor, which can be used by clients and relatives who live at home in the community, has also recently been tested. So far, three clients have had the home system installed since January/February 2003. Again the system has been successful in detecting potential wandering events and no untoward incidents have occurred.

**Discussion**

These studies have been designed with limited objectives to determine the feasibility, acceptability and reliability of the electronic monitoring equipment. Several interesting points have emerged from these studies.

1. There have been no genuine incidents where a resident has escaped from the building undetected. In all cases where a resident has entered a danger zone the intrusion has been detected and registered as an alert on the pager. The equipment has been 100% accurate.
2. In the residential home there have been sometimes as many as 15 internal wandering events per day. Most of these events were minor where a resident opened the door to the staircase or a kitchen and quickly closed it again without leaving the safe area. Although these events could not be considered dangerous and were part of normal wandering behaviour the view of the staff and relatives is that the system was successful in preventing dangerous situations from developing.
3. In the three different scenarios where the equipment was used, staff and relatives felt reassured by being alerted immediately to every wandering event and they could decide how to respond. The ability to intervene early prevented wandering events from developing into a dangerous situation. Only the use of a Control Group in a Randomised Controlled Trial (without the ability to intervene) would allow us to estimate the true benefits of the equipment.

**Conclusion**

These pilot projects with limited objectives have been highly successful. The equipment has excellent performance and demonstrated none of the inadequacies of earlier studies [1]. No genuine events were missed and there were
no significant false alarms. Compliance and consent was not an issue with residents and relatives. In fact, most relatives were very willing to participate.

However, even if the technology is successful there are substantial ethical issues to be addressed which have already generated considerable controversy [2]. 'Some people worry about the need to seek consent from those who are tagged. The paradox is that this issue is often not raised when it comes to some other forms of restraint' for example physical or chemical restraints yet they are expected to consent before they are tagged [3].

Counsel and Care’s publication ‘The Right to Take Risks’ (1993) [4] lists at least 20 forms of restraint commonly used at present, ranging from literally tying someone down to the use of sedatives, locks, glass panels in doors, threats and poverty. This new technology, developed and perfected as a result of its uses in prisoner tagging, offers hope of a more humane solution to a difficult problem.

We feel that electronic tagging is the least restrictive method of constraint for patients with wandering and dementia. In view of the success of this pilot study further large-scale trials are indicated of the equipment.

References


Received 12 May 2003; accepted in revised form 4 December 2003