

Monitoring the effectiveness of the Talley Quattro Acute mattress replacement system

Identifying suitable pressure relieving mattresses to meet patient and organisational needs is a challenge for many healthcare professionals. This article describes a small evaluation which explored the use of the Talley Quattro Acute mattress replacement system in an acute NHS trust. Over a seven-month period nine mattresses were evaluated across a range of clinical settings. Sixty-seven patients were assessed and nursed on the mattresses. Despite being a small study the outcomes demonstrated the suitability of the Quattro Acute Mattress for patients at high to very high-risk of pressure ulcer development.

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KEY WORDS

Alternating pressure relieving mattresses

Mattress evaluation

Pressure ulcer prevention

With the plethora of dynamic pressure relieving mattresses now available, selecting the most appropriate product has become a complex process. This together with a lack of good quality research to support any particular product's effectiveness can make it even more difficult. However, rapid changes in healthcare technology and clinical practice mean that medical devices play an increasingly important role in supporting patient care (Department of Health, 2000). In order to meet individual patient requirements there needs to be evidence available to support a product's effectiveness within a clinical arena.

This small evaluative study was undertaken to identify whether the Quattro Acute mattress was suitable for the specific needs of patients within one acute NHS trust.

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Local provision of pressure relieving mattresses

There is a range of alternating pressure mattresses available for use within the Royal Cornwall Hospitals Trust (RCHT). The majority of equipment is owned by the trust, however, with the ever increasing demand have also been leased and rented products to meet shortfalls.

Rationale for the project

The trust had been renting the DC Acute mattress (Talley Group, Hampshire) for a number of years. The company then superseded this product with the Quattro Acute mattress and the trust were offered this as a replacement. There was, however, a lack of clinical evidence to support this product's effectiveness for patients who were at high to very high-risk of pressure damage.

When comparing cost alone it was found to be cheaper than other products available on the market but evidence that it was clinically effective was needed to assess its true value for money.

The Quattro Acute mattress replacement system

The Quattro Acute mattress replacement system is designed for the prevention and treatment of pressure ulcers for very high-risk patients with very limited mobility within the acute hospital environment (Hampton, 2003). The cellular structure is patented and designed to redistribute load at the patient's pressure points through air cells that operate in a one in four alternating cycle.

Aims

The aim of the project was to identify whether the Quattro Acute replacement mattress would be a safe and effective purchasing alternative for local needs.

Method

The assessment lasted for seven months from October 2003 until May 2004. It was decided to use an adverse event analysis methodology where data was collected on all patients entered into the study with in-depth data to be collected for those patients who developed adverse events.

Ethics approval was sought but it was decided that this was not required as the product was already widely available and in clinical use across the country.

Nine Quattro Acute mattresses supplied by the Talley Group were available for the duration of the study and were located in three clinical areas — acute medical (care of the elderly), vascular surgery, and rheumatology (chronic disease). These areas were chosen because they were regular users of alternating pressure-relieving mattresses for high to very high-risk patients. The participating patients had a mix of acute and chronic conditions.

Before the project began training was given to staff by the Talley Group representative and the trust's equipment coordinator on how to use the Quattro Acute mattress.

Following assessment of the patient's clinical condition and pressure ulcer risk, the ward staff used the trust's equipment selection guidelines to determine the appropriate mattress to suit each individual patient's needs.

Pressure ulcers were graded using the Stirling Consensus Grading system (Reid and Morrison, 1994). The ward staff in the selected areas then had the option to use the Quattro Acute mattresses, if the risk assessment highlighted a need for a replacement mattress. Once placed on the mattresses, patients' demographic and clinical data were collected.

The nurses responsible for the care of the patient continued to monitor the patient's pressure areas and any adverse events were to be reported to the tissue viability team. Evidence of pressure ulcer healing outcomes were not included in the study at the beginning, however, the forms were amended part way through in order to incorporate this information. Adverse events were classified as:

- ▶▶ A new pressure ulcer developing while the patient was using the mattress
- ▶▶ An extension of an existing pressure ulcer while using the mattress
- ▶▶ Staff expressed concerns regarding the patient's clinical risk related to continued use of the mattress
- ▶▶ Patients requesting to be taken off the mattress.

If an adverse event occurred an adverse event form was completed and the patient's records reviewed to determine what caused the event and its severity. The incident was then reported via the trust's risk management system (PRISM). When the patient was taken off the mattress a data collection form was completed and kept on file in each clinical area.

At the end of the seven-month project all data were analysed according to the following:

- ▶▶ Clinical condition of patients using the mattresses
- ▶▶ Average age of patients
- ▶▶ Gender of patients
- ▶▶ Risk category of patients
- ▶▶ Mobility status
- ▶▶ Grade of pressure damage where applicable

- ▶▶ Average length of time on the mattress
- ▶▶ The patient's experience of using the equipment
- ▶▶ Number of adverse events
- ▶▶ Specific nature of adverse events.

A staff satisfaction survey was conducted at the end of the study period. All ward staff across three clinical areas were asked seven questions; 16 staff responded. The survey included an equal mix of registered and non-registered staff. The questions asked were:

- ▶▶ Was the mattress system simple to set up?
- ▶▶ Was the system quick to deflate?
- ▶▶ Were the noise levels low?
- ▶▶ Was cleaning simple?
- ▶▶ Were there any faults in the equipment?
- ▶▶ Were there any complaints from the patient?
- ▶▶ What was the overall impression of the system?

Results

Demographics

At the end of the seven months a total of 67 patients had been entered into the study. The patients were aged 21–95 years with a mean age of 72 years and a sex distribution of 36 (54%) women and 30 (45%) men. One participant's sex was unrecorded. There was a range of clinical conditions — acute medical (n=14; 21%), acute vascular surgery (n=23; 34%), chronic disease (n=30; 45%). Coexisting diseases ranging from diabetes, cerebral vascular incidents, and COPD were present in 49 (73%) of the participating patients. Peripheral vascular disease was also an associated risk factor in the acute medical patient group.

Mattress use

The number of days that patients were placed on the mattress totalled 1,263 over the seven-month period. This ranged from 1–79 days for each patient with a mean number of 17.5 days.

Risk

The patients' Waterlow risk assessment scores ranged from 9 (no risk) to 34 (high risk) with a mean score of 19. Therefore, the majority of patients were at high risk of developing pressure damage (Pancorbo-Hidalgo et al, 2006).

Mobility of patients

Of the 67 participants, 25 (37%) were bed

bound; 36 (53%) sat out of bed in a chair and had limited mobility and six (9%) could walk to the toilet or walk independently.

Grade of pressure damage

There was no pressure damage in 31 (46%) patients who entered into the study; 36 patients (54%) had existing pressure damage of the following grades:

- ▶▶ Grade 1 (n=18)
- ▶▶ Grade 2 (n=11)
- ▶▶ Grade 3 (n=1)
- ▶▶ Grade 4 (n=2)
- ▶▶ 1 patient – Grades 1 and 2 (2 different sites)
- ▶▶ 2 patients – Grades 1 and 3 (2 different sites)
- ▶▶ One patient had an ulcer that was not graded.

Pressure damage sites

The patients' pressure damage was in varying places:

- ▶▶ Heel pressure damage (n=5)
- ▶▶ Sacral pressure damage (n=8)
- ▶▶ Buttock pressure damage (n=5)
- ▶▶ Other sites (n=4)
- ▶▶ Multiple sites (n=14).

Patient's ratings of mattress comfort

The patients were asked to rate the comfort of the mattress during the period of mattress use and were asked to give it a score from 1 (uncomfortable) to 5 (very comfortable).

The results were as follows

- ▶▶ Comfort level 5 (n=21)
- ▶▶ Comfort level 4 (n=10)
- ▶▶ Comfort level 3 (n=15)
- ▶▶ Comfort level 2 (n=1)
- ▶▶ Comfort level 1 (n=3)

Seventeen patients were unable to provide this data due to their clinical condition.

At the end of the study only one patient developed pressure damage and no patients' grade of damage increased.

Adverse events

Out of the 67 patients who entered the study one patient developed pressure damage while using the mattress.

Staff satisfaction

The overall feedback was very positive. The mattresses was easy to set up and quick to deflate. Noise levels and faults were low. 100% of staff found the system easy to clean. Patient satisfaction was good, as was the

overall impression of the Quattro Acute mattress.

Discussion

Despite the small number of patients in this study, the outcomes show that the Quattro Acute replacement mattress system is suitable for patients at high to very high-risk of pressure damage.

This study, however, did not detail the patients' ability to reposition themselves or the repositioning schedules, which are also important in the management and prevention of pressure ulceration. There was a higher percentage of patients entered into the study with pressure damage than without, yet there was no deterioration in the grade of ulceration. As highlighted in the study methodology the reduction in size and grading was not measured until part way through the study period. This was because the initial study design was to undertake an adverse event analysis and report if patients developed pressure ulceration or if pressure ulcers deteriorated while on the mattress. It was, however, seen as valuable to report when pressure ulcers were improving. Due to the time factor involved for clinical staff in evaluative studies this was felt to be the best methodology to achieve the desired results.

The majority of patients had pressure damage of low grading (stage 1 and 2) and with only 4 (6%) that had Grade 3 or 4 damage.

It was interesting to note the mean number of days patients were on the mattresses. Patient throughput in acute NHS hospitals has increased over the past few years with the drive towards a primary care-led NHS and a mean of 17.5 days was higher than expected. One of the clinical areas chosen for the study, however, included older patients with acute illnesses and the discharge process can take longer in this group; many patients are unable to take care of themselves on discharge following an acute illness, therefore, the length of stay is increased while alternative accommodation is found. Another clinical area admitted patients with chronic rheumatoid conditions who required acute monitoring. The length of stay is variable in this patient group, however, it is often longer than some acute medical patients due to the chronic nature of their disease and the complexity of managing acute episodes in the disease process.

Measuring comfort levels is very subjective, however; the majority of patients who were able to comment felt that the mattress was comfortable and in fact two patients asked if they could purchase their own once they had been discharged.

One elderly patient did develop stage 2 pressure damage on his heel while on the mattress. When the other patient variables were analysed it was difficult to determine if the mattress was the main contributing factor. He was acutely ill with respiratory failure and had peripheral vascular disease. His condition rapidly deteriorated and he died three days after being put onto the mattress.

The staff survey reflected positive feedback towards the product in the areas of ease of use, rapid deflation, low noise levels and ease of cleaning. There were no faults reported during the study period, however, one staff member reported that the umbilical cord (the covered tube connecting the mattress to the electric pump) became trapped in the cot sides. As a result of the study Talley altered the position of the connectors so this would no longer be an issue.

Most of the staff said that their overall impression of the Quattro Acute mattress was that it was good (n=13; 81%); one (6%) said it was fair and none rated it as poor. 13% of staff did not comment on the overall impression. Two staff members commented that the mattress was 'very good' and 'fantastic'.

Conclusion

In conclusion this study shows that patients who were assessed as high to very high risk of pressure damage were safely managed on the Quattro Acute mattress replacement system. Staff were satisfied that the product met their expectations and the majority of patients found it comfortable. It was easy to use and noise levels were low.

Unfortunately the effect of the mattresses on existing pressure ulcer status was not monitored as part of this study as data were only collected if a patient developed damage or an existing area became worse. Halfway through the study the forms were, however, amended.

Key Points

- ▶▶ A small evaluation study (n=67) explored the use of the Talley Quattro Acute mattress replacement system in an acute NHS trust over a seven-month period.
- ▶▶ Only one patient developed pressure damage while using the mattress.
- ▶▶ The mattress was found to be suitable for patients at high and very high risk of pressure damage.
- ▶▶ The patients found the mattress comfortable and clinicians found it easy to use.

The mattresses are still being used in the clinical areas of the trust and continue to provide effective pressure ulcer prevention and management support.

The authors feel that the small study was a valuable piece of work for our organisation and it has supported the Royal Cornwall Hospital Trust's decision making and procurement practices at a local level. The mattresses are still popular with staff and patients and have been suitable for use across all areas. The faults reported remain low and the mattresses are, therefore, suitable for very busy clinical environments. Within the trust there is a range of alternating pressure mattresses, however, the trust owns a large quantity of the Quattro Acute system. **WUK**

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