Evaluation of the performance of a chlorhexidine gel containing CVC dressing in a clinical environment

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INTRODUCTION

• Although infection risk associated with central venous catheters (CVC) has declined in recent years, CVC are still associated with a large number of infections, leading to increased patient morbidity and costs.
• A major source of microbial colonisation and infection of short-term CVC is the patients’ endogenous skin microorganisms at the CVC insertion site.
• A chlorhexidine (CHG) gel dressing can reduce CVC colonisation and catheter related infection in patients.1
• The rate of contact dermatitis with the first generation CHG gel dressing was reported as 1.1%.2

OBJECTIVE

To evaluate the introduction and performance of a CHG gel CVC dressing in a critical care environment.

METHODS

Description of the standard and investigational CVC dressings

• 3M™ Tegaderm™ CHG IV dressing
  - An adhesive, semi-permeable, transparent polyurethane film dressing incorporating a transparent gel pad containing 2% (w/v) CHG (Figure I).
• 3M™ Tegaderm™ IV dressing
  - An adhesive, semi-permeable, transparent polyurethane film dressing.

Study setting

• Ethical committee and University Hospitals Birmingham NHS Foundation Trust R&D Department approvals were obtained prior to the study.
• 3M™ Tegaderm™ CHG IV dressing was applied to all the patients who had a short-term CVC or vascular access catheter for dialysis (vasaflow) inserted on the critical care unit or in theatres over a 9-month period. For comparison, a standard Tegaderm dressing was evaluated prior to and following the CHG dressing phase.
• Standard CVC care on the unit included: skin cleansing with 2% (w/v) CHG in 70% (v/v) isopropyl alcohol (Chloraprep®, CareFusion, Basingstoke, UK) prior to CVC insertion and during dressing changes. Scheduled dressing changes were every 7 days or earlier if indicated (soiled, wet or loosened dressing).

Patient population/clinical environment:

• The study was undertaken at a large University Hospital, which included four adult critical care units with a total of 75 critical care beds.
• Critical care specialties included:cardiology, cardiothoracic surgery, neurology, neurosurgery, trauma, burns, liver medicine, liver surgery, general medicine, general surgery, maxillofacial surgery and cardiac, lung and liver transplantation.

Staff training

• Was provided by 3M prior to the commencement of the study; during the study researchers provided support and further training as and when required.
• Training was undertaken in small groups (1-5 people).
• The training included:
  • technique for dressing application (to prevent untimely dressing detachment; use of aseptic non-touch technique);
  • indications for changing the dressing, including observation of gel saturation;
  • observation of the CVC site and skin condition;
  • technique for removing the dressing (without causing skin trauma or CVC dislodgement).

Performance characteristics of the dressings

• Healthcare workers’ perceptions of the performance of the dressing were evaluated at the end of the study by distribution and subsequent completion of anonymised questionnaires.

Skin condition under the dressing

• Skin condition was closely evaluated in all the study patients. The skin condition was evaluated visually by the researchers or nurse looking after the patient. This included observation for any skin erythema, oedema, skin maceration or exudate (including pus).
• Any adverse events were determined as per standard clinical practice.

RESULTS

Performance characteristics of the dressings

• 273 patients were evaluated at the time of dressing removal (CHG n=136; standard n=137).
• The median duration of CVC placement was 6 days (IQR 4-8).
• The median number of dressing changes per patient in both standard and CHG dressing group was 1 (IQR 1-2), which did not vary significantly between:
  • the type of dressing used (p=0.958, Mann-Whitney test);
  • the location of the CVC insertion site (internal jugular, subclavian and femoral vein sites; p=0.749, Kruskal-Wallis test);
  • the type of CVC (quad lumen CVC or Vascat; p=0.621, Kruskal-Wallis test);
• or when one or multiple CVC were inserted in the same anatomical location (p=0.237, Kruskal-Wallis test).
• There was no significant difference in the CVC and suture site phiblets scores between the two study groups (both dressing groups median score 0 (IQR 0-1) for CVC site (p=0.875) and 0 (0-2) for suture site (p=0.578); Mann-Whitney test).

User evaluation

• During the change-over period from CHG dressing to standard dressing, a questionnaire was distributed to critical care and theatre staff, who had experience applying, removing or observing both the standard CVC and CHG gel containing CVC dressings.
• In total, 71 nurses and 10 anaesthetists responded to the survey.
• Staff were satisfied with the performance of the CHG dressing, with 97.5% of the respondents rating the overall performance of the CHG gel dressing as: the same as (11.1%), better (35.8%) or much better (50.8%) than the standard CVC dressing. The CHG dressing also performed either better or much better according to other criteria as shown in figure 2.
• The perception of the dressing performance was not affected by the length of time the respondent had worked in critical care units/ theatres (p=0.942, Spearman’s correlation r=0.009).

Skin condition under the dressing

• There were no reports of severe contact dermatitis associated with the CHG or standard dressings.
• Close assessment of skin condition at the CVC site was carried out in 273 patients: following dressing removal, mild erythema under the adhesive was reported in one standard dressing group patient (0.7%, n=137) and in seven CHG dressing group patients (5.1%, n=136). Only one patient presented with mild erythema under the CHG gel component of the dressing (0.7%, n=136). All the above symptoms resolved within 24 h following dressing removal.

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CONCLUSION

• With appropriate training and education of staff, the CHG gel CVC dressing was well tolerated by patients and performed effectively in the critical care environment.