TITLE: Personal Protection Suits (Stryker Suits) for Total Hip and Knee Arthroplasty: Clinical and Cost-Effectiveness

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RESEARCH QUESTION:

1. What is the clinical effectiveness of personal protection suits (Stryker suits) for total hip and knee arthroplasty surgery?

2. What is the cost-effectiveness of personal protection suits for total hip and knee arthroplasty?

METHODS:

A limited literature search was conducted on key health technology assessment resources, including PubMed, the Cochrane Library (Issue 3, 2008), University of York Centre for Reviews and Dissemination (CRD) databases, ECRI, EuroScan, international health technology agencies, and a focused Internet search. Results include articles published between 2003 and Sept 2008, and are limited to English language publications only. No filters were applied to limit the retrieval by study type. Internet links are provided, where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.

RESULTS:

HTIS reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by economic evaluations, randomized controlled trials, controlled clinical trials, and observational studies.
One randomized controlled trial, one controlled clinical trial, and three observational studies were identified. The literature search did not identify any health technology assessments, systematic reviews, meta-analyses, or economic analyses. Additional articles of potential interest are included in the appendix.

OVERALL SUMMARY OF FINDINGS:

A randomized controlled trial (Der Tavitian et al. 2003) \(^1\) compared the effectiveness of body-exhaust suits (BES) with Rotecno occlusive clothing, worn by scrub teams during 50 total knee replacements. Air and wound bacterial counts were used to assess the effectiveness of the clothing. Bacterial air counts were higher with Rotecno, suggesting that this clothing was less effective than BES, but it did not result in higher wound infection compared with BES. The authors suggest that since contamination from the air did not appear to significantly contribute to wound bacterial infections, other sources of contamination should be assessed.

Pasquarella et al. (2003) \(^2\) performed a controlled clinical trial of 62 hip joint arthroplasties, using either conventional gowns or body exhaust gowns in an operating room with mixed/turbulent ventilation and separate operating and anesthetic areas. Bacterial counts were taken on patient sterile areas, on the floor, and on anesthetic equipment. Use of body exhaust gowns did not significantly reduce bacterial contamination when compared with conventional clothing. The authors also state that the low bacterial counts in the operating area were similar to counts expected in an area with a more expensive ultraclean laminar airflow unit.

Three observational studies assessed BES during knee or hip arthroplasty. Fan et al. (2008) \(^3\) retrospectively studied infection rates and potential risk factors in 479 total knee replacements in 353 patients. The mean follow-up period was 46 months (range 1-107). Operating rooms used vertical laminar airflow; BES, water impermeable gowns, and double gloves were worn; and prophylactic antibiotic covers were used. Overall infection rate was 3.0%; acute deep infection rate, within four weeks, was 0.2%; delayed deep infection rate, within four weeks to two years, was 0.6%; the superficial infection rate was 1.9%; and the late deep infection rate, after two years was 0.6%. The authors conclude that these infection rates are comparable to international rates.

Byrne et al. (2007) \(^4\) performed a study with 80 patients undergoing hip and knee cemented arthroplasty. Surgery was performed in ultra-clean theatres and all scrubbed personnel wore total BES. Eighteen patients (22.5%) experienced contamination at 21 sites (4.8%). Lower contamination rates were associated with shorter duration of surgery and fewer gowned personnel in the ultra-clean system and in the theatre during the procedure. Although intraoperative contamination was high, this did not result in a high rate of postoperative infection, and no patient developed clinical evidence of deep prosthetic infection at follow-up.

Miner et al. (2007) \(^5\) examined the results of 8,288 total knee replacements performed in 256 hospitals. The cumulative incidence of infection was assessed during a 90-day follow-up. Twenty-eight procedures (0.34%) resulted in deep infection requiring subsequent operations. The incidence of deep infection requiring subsequent operations for all combinations of laminar airflow systems and body exhaust suits was 0.27% to 0.43%; the risk ratio for laminar airflow systems was 1.57 (95% CI, 0.75-3.31) and for BES was 0.75 (95% CI, 0.34-1.62). The authors state that risk of infection was not statistically associated with either method, and infections were rare.
In summary, while there is some evidence that the use of BES in operating theatres may reduce infection rates after hip and knee arthroplasties, this protection may not be significantly better when compared with conventional methods.
REFERENCES SUMMARIZED:

Health technology assessments
No literature identified

Systematic reviews and meta-analyses
No literature identified

Economic analyses and cost information
No literature identified

Randomized controlled trials


Controlled clinical trials


Observational studies


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APPENDIX – FURTHER INFORMATION:

Review articles


Additional references


