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Effectiveness of extended infection control measures on MRSA infection among orthopedic surgery patients.

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Abstract

A study on the effectiveness of Extended Infection Control Measures (EICM) on MRSA infection among Orthopedic surgery patients was carried out in a tertiary care hospital with the aim of finding the effectiveness of EICM in reducing MRSA infection among orthopedic patients and the determinants of MRSA infection.

The study has been carried out in two phases. In phase 1, the infection rate was established by reviewing the medical records of orthopedic surgery patients for one year. The infection control practices followed by healthcare professionals (HCP) were also observed in orthopedic wards using an observational checklist. In phase 2, EICM was implemented. The measures included in EICM were hand decontamination, screening and treatment of orthopedic surgery patients and healthcare professionals (HCPs), staff education, feedback of surveillance data to HCPs, isolation of MRSA infected patients, nasal decolonization or use of peri-operative nasal mupirocin for emergency surgery patients, skin decolonization, having separate equipment for patient with MRSA infection, appropriate floor cleaning and terminal cleaning of ward with 0.1% sodium hypochlorite.

The effectiveness of EICM was measured in terms of reduction in MRSA infection, improvement in knowledge of HCPs on MRSA infection and prevention, and improvement in infection control practices. To measure these outcomes, five research tools (demographic proforma for both patient and HCPs, bacterial culture test, observational checklist on infection control practices, risk assessment checklist on MRSA and knowledge questionnaire on MRSA infection) were used. All the tools were developed by the investigator and validated by experts. Reliability of the tools was established using

appropriate methods and all the tools were pre-tested. A pilot study was carried out and the methodology was found feasible.

In phase 1, among 4,382 orthopedic surgery patients, 2,249 medical records were eligible for collection of baseline rate of MRSA infection. Overall infection rate was 32.2% and MRSA accounted for 27.7% infection. Infection control practices observed (200 observations) were good except for hand hygiene. In phase 2, EICM was implemented and tested for its effectiveness. Samples included in the study were orthopedic surgery patients (168), HCPs (154), infection control practices (535 observations), and MRSA infected patients to find the determinants (130 cases and 130 controls). The outcomes measured were infection rate, compliance to infection control measures, detection and treatment of MRSA carrier (both patients and healthcare professionals), and knowledge of HCPs on MRSA infection and its prevention. The MRSA infection rate reduced to 13.1% from 32.2% and MRSA infection fell from 27.7% to 6%. The compliance to infection control practices in orthopedic wards, ICU, Trauma Triage and operation rooms was found good. However, hand hygiene still required further improvement. MRSA carriers (HCPs) were treated effectively and 'zero' carrier status was maintained during the study period. Knowledge on MRSA infection and its prevention among HCPs had significant ($p<0.001$) improvement.

Patients treated with surgical procedures (OR 4.355; CI 1.03, 18.328; p=0.045), prolonged hospitalization (OR 0.307; CI 0.11, 0.832; p=0.020), presence of tracheostomy tube (OR 5.298, CI 1.16, 24.298; p=0.032), presence of pressure/venous ulcer (OR 7.205;

CI 1.75, 29.606; p=0.006) and previous recent hospitalization (OR 2.883; CI 1.25, 6.631; p=0.013) were the significant determinants of MRSA infection in our study.

The study concluded that EICM is effective in enhancing the reduction in MRSA infection among orthopedic surgery patients. EICM can be effectively utilized in the routine care of orthopedic patients for better outcomes during their hospital stay and EICM can also be implemented in the entire hospital to reduce infection rates as hospital associated infection is considered as one of the quality indicators in hospital practice.

The study was conducted in a single center and there was no control group as another similar setting was not available. A few healthcare professionals did not participate in the study. Though the study result cannot be generalized, the infection rate was considerably reduced showing the effectiveness of EICM. Hence, EICM can be adopted in hospitals to combat the infection from multidrug resistant pathogens.