



## MRSA colonisation in spinal cord injury : Implications on patients rehabilitation

Hazem HASSOUNA, Ehsan UI HAQ, Angela GALL

*From the Spinal Cord Injury Centre, Royal National Orthopaedic Hospital, Stanmore, Middlesex, UK*

MRSA has become a major cause of nosocomial and community acquired infections in the past few years. Our hypothesis is that MRSA colonisation affects the length of stay in hospital, thereby adding a strain on resources.

Data from the last 20 patients admitted to the Spinal Injury Care Unit (SICU) who were MRSA positive (study group) have been analysed and then matched with data from 20 patients who were MRSA negative (control group) to compare their total hospital stay and the factors which affect the length of hospital stay. The mean age of the study group patients was 38.8 years. The average time between injury and admission in SICU was 76.5 days in the study group compared to 28.7 days in the control. The mean stay duration was 412.15 days in the study group as opposed to 187.2 days in the control group. Nearly 45% had developed pressure sores in the study group as compared to 25% in the control group.

Our study indicates that MRSA colonisation in spinal injured patients leads to longer hospital stay, delay in admission to spinal care units, and development of pressure sores and further infection. These factors have adverse effects on patients' rehabilitation.

**Keywords :** spinal injury ; adult ; infection ; MRSA ; rehabilitation.

### INTRODUCTION

Globalisation has entailed a massive increase in trade and human mobility facilitating the rapid spread of infectious agents, including those that are

drug-resistant. A particularly serious threat is posed by Methicillin-resistant *Staphylococcus Aureus* (MRSA). It has become a major cause of nosocomial and community acquired infection in the past few years. The purpose of this study is to examine the implications of MRSA colonisation on the care of spinal cord injury patients.

### PATIENTS AND METHODS

A retrospective case controlled study was undertaken in which data from the last 20 patients admitted to the Spinal Injury Care Unit (SICU) who were colonised with MRSA (study group) has been analysed and then matched with data from 20 patients who were MRSA negative (control group) to compare their total hospital stay and the factors which affect the length of stay in hospital with MRSA and spinal cord injury.

All patients were matched for age, American Spinal Injury Association (ASIA) scores and the presence of pressure sores. Statistical analysis was done using Student's *t* test.

---

■ Hazem Hassouna, AFRCSEd, Orthopaedic Registrar.

■ Ehsan UI Haq, Postgraduate MSc Fellow.

■ Angela Gall, Consultant in Spinal Rehabilitation.

*Spinal Cord Injury Centre, Royal National Orthopaedic Hospital, Stanmore, Middlesex, United Kingdom.*

Correspondence : Hazem Hassouna, Department of Orthopaedics, Princess Royal Hospital, Haywards Heath, RH16 4EX, United Kingdom. E-mail : hhassouna@gmail.com

© 2008, Acta Orthopædica Belgica.

---

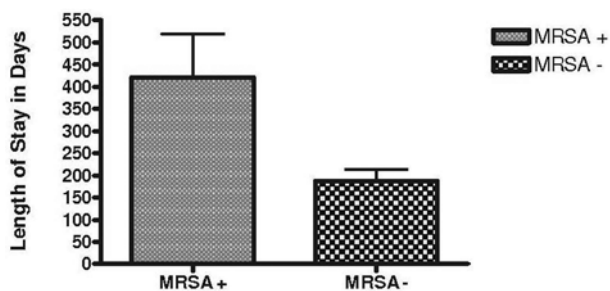


Fig. 1. — Length of stay of patients with and without MRSA.

## RESULTS

The mean age of the MRSA positive patients (study group) was 38.8 years (range 18-82), similar to the MRSA negative patients (control group) (range 17-76). Fourteen (60%) of MRSA positive patients had ASIA grade A. The average time between injury and admission in the spinal unit was found to be 76.5 days (range 2-304) in the study group, versus 28.7 days (range 2-187) in the control group. This resulted in a mean stay of 412.15 days (range 127-1890) in the study group and 187.2 days (range 24-455) in the control group. Statistical analysis using Student's *t* test showed a statistically significant difference with *p* value < 0.0001 between the two groups (fig 1).

At discharge it was found that 13 (65%) patients in the study group were discharged home, and 14 (70%) in the control. Four (20%) patients of each group were transferred to intermediate housing. On the morbidity front, 9 (45%) patients developed pressure sores in the study group as compared to 5 (25%) patients in the control group.

The results of this study showed an increase in the length of hospitalisation for MRSA positive patients (mean 421.15 days) as compared to MRSA negative patients (mean 187.2 days) with *p* value < 0.0001. Fourteen MRSA positive patients (60%) had complete spinal cord injury.

## DISCUSSION

The importance of this study is the mortality/morbidity associated with MRSA positive colonisation in spinal injury patients and the drain

on resources it causes. It has been found in an earlier study (9) that the hospital stay is longer than normal, in MRSA positive patients. As the authors (9) already mentioned in their study, the patients with complete spinal cord injury (ASIA Grade A) showed a significantly higher incidence of MRSA than those with incomplete injuries. Our study showed that 14/20 (60%) of MRSA positive patients had ASIA grade A. This shows that the patients with complete spinal cord injury are more likely to get MRSA. These patients were on catheters for bladder drainage and had little control on the bowel which led to frequent soiling of the perineum leading to higher susceptibility to infections. They are more dependent and need to have assistance, so the contact with health workers is more.

Our study significantly demonstrates that patients who are MRSA positive have twice longer a hospital stay than MRSA negative patients. Patients with spinal cord injuries are at greater risk for developing infections caused by multi-resistant microorganisms because of their prolonged hospital stay (3).

It is also noted that MRSA positive patients had taken 2.5 longer to be admitted to the Spinal Injury Care Unit.

In some institutions, the facilities for caring for MRSA patients are inadequate due to lack of resources or funding. Isolation rooms, barrier nursing facilities are expensive. Inexperience and lack of staff training are contributing factors.

These patients are also susceptible to developing pressure sores (45% compared to 25% of MRSA negative patients). This is probably due to immobility, and the presence of these sores is fertile ground for infection breeding (5). This is becoming one of the most vexing points in the treatment both from the patients' as well as the surgeons' point of view. The risk of contamination to surgical wounds is higher, particularly when there is a metal implant. Other sources of infection were urinary catheters, skin, postoperative, intravenous catheter site (2). However, patients in a rehabilitation hospital with MRSA colonisation may receive intensive physical and occupational therapy as long as special precautions are observed to prevent MRSA spread (1).

Also MRSA positive patients are often isolated from the main ward (6,7). This may lead to decreased patient morale, anger (8) and even depression (4). This in turn, can trigger lack of patients' cooperation in the treatment. These patients tend to refuse investigations and show apathy to the treatment being offered. In conclusion, our study indicates that MRSA colonisation in spinal injured patients and the development of pressure sores can lead to longer hospital stay and delayed admission to spinal care units. These factors have adverse effects on patients' rehabilitation. Isolation of MRSA positive patient results in decreased morale and depression. More resources are required to compact MRSA colonisation and subsequent clinical and psychological effects.

#### REFERENCES

1. **Aeilts GD, Sapico FL, Canawati HN, Malik GM, Montgomerie JZ.** Methicillin-resistant-Staphylococcus aureus colonization and infection in a rehabilitation facility. *J Clin Microbiol* 1982 ; 16 : 218-223.
2. **Bhatt K, Cid E, Maiman D.** Bacteremia in the spinal cord injury population. *J Am Paraplegia Soc* 1987 ; 10 : 11-14.
3. **Boque MC, Bodi M, Rello J.** Trauma, head injury, and neurosurgery infections. *Semin Respir Infect* 2000 ; 15 : 280-286.
4. **MacKellaig JM.** A study of the psychological effects of intensive care with particular emphasis on patients in isolation. *Intensive Care Nurs* 1987 ; 2 : 176-185.
5. **Maeder K, Ginunas VJ, Montgomerie JZ, Canawati HN.** Methicillin-resistant Staphylococcus aureus (MRSA) colonization in patients with spinal cord injury. *Paraplegia* 1993 ; 31 : 639-644.
6. **Murphy DP, Lampert V.** Current implications of drug resistance in spinal cord injury. *Am J Phys Med Rehabil* 2003 ; 82 : 72-75.
7. **Pick FC, Rose M, Wang D, Gardner BP, Gillett AP.** The prevention of spread of methicillin resistant Staphylococcus aureus in a spinal injuries centre. *Paraplegia* 1994 ; 32 : 732-735.
8. **Tarzi S, Kennedy P, Stone S, Evans M.** Methicillin-resistant Staphylococcus aureus : psychological impact of hospitalization and isolation in an older adult population. *J Hosp Infect* 2001 ; 49 : 250-254.
9. **Thom JD, Wolfe V, Perakash I, Lin VW.** Methicillin-resistant Staphylococcus aureus in patients with spinal cord injury. *J Spinal Cord Med* 1999 ; 22 : 125-131.