– A prospective study of 2441 patients.

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INTRODUCTION
Nosocomial infection is a serious hospital health hazard worldwide. Despite advances in the control and prevention of nosocomial infection, they continue to remain a major side effect of hospital treatment and contribute significantly to the rate of morbidity, mortality and cost of care. It is estimated that surgical site infections develop in 2 to 5% of the 16 million patients undergoing surgical procedures each year. They account for about 24% of all nosocomial infections. The problem is aggravated in developing countries, where resources are scarce and staffs are always in short supply.

Few studies address the issue of nosocomial infection in Neurology and Neurosurgery, as they are peculiar to them and associated with higher morbidity and mortality. A study was undertaken to determine the incidence of post-operative nosocomial infection in neurosurgical patients in the post-operative period at AIIMS.

OBJECTIVES OF STUDY
i. To find out the incidence of post-operative nosocomial infection in neurosurgical patients.
ii. To identify and analyze the bacterial flora.
iii. To identify the patients at risk for developing nosocomial infection.

PATIENTS & METHODS
In this prospective study 2441 neurosurgical patients operated upon over a period of 1 year (Jan- Dec. 2001) have been analysed. A total of 2558 operations were performed, 1824 as routine and 734 as emergency cases. 117 patients who had pre-operative infections were excluded from the study and they comprised of brain abscess, ventriculitis and sub-dural empyema and meningitis. Patients, who were admitted in the hospital for less than three days were excluded from the study.

In all patients, with post operative fever 38°C or above, with purulent tracheobronchial secretions, soaks from the wound, their body fluids like blood, CSF, Swab from tracheobronchial secretions, pericranial skin, wound aspirate and urine were sent for bacteriological studies and analyzed.

STATISTICAL ANALYSIS
The results were analyzed using descriptive statistics.

RESULTS
Post operative nosocomial infection was observed in 7.03% (180) patients. Infection at single site was observed in 70% (126) while 30% (54) had infection of various sites. Analysis of the data revealed the chest infection 2.7% (67) was the most common infection encountered in post-operative neurosurgical patients followed by meningitis 2.2% (55) and wound infection 1.6% (40).

Largest number of cases were recorded in the age group of 40 to 50 years (38-21%) 51-60 (36-20%) and 15 cases above the age of 60 years. An overall infection rate was higher in emergency cases 12.48% as compared to routine cases 8.3%.

Primary and Co-morbid Disease
The most common underlying condition was head injury (57) followed by intracranial tumours (76) and hydrocephalus (47). The surgical procedure performed included supratentorial craniotomies 40, infratentorial craniotomies 20, external ventricular drainage 83 and ventriculoperitoneal shunts 37.

In this study 72 patients had altered sensorium, 12 were diabetic, 94 were electively ventilated, 68 had endotracheal intubations and 24 tracheostomized, 14 had CSF leak, 19 external ventricular drainage and 132 had an indwelling urinary Foley’s catheter.

RISK FACTORS
Risk factors which played significant role in the causation of post operative nosocomial infection at various sites were.

Altered Sensorium : Of the total 180 infected cases, 92 had altered sensorium, 54.3% (50)
developed chest infection and among the fully conscious only 19.3% (17) acquired chest infection.

- Elective Ventilation: increased the risk to chest infection. 60.6% developed chest infection of the total ventilated 71.2% patients.

- CSF Leak: It increased the risk to meningitis. In this study 11 out of 14 patients with CSF leak eventually developed meningitis.

- External Ventricular Drainage
  Of the total 19 patients with external ventricular drainage, 11 developed meningitis and had extra ventricular drainage > 5 days. Acinetobacter was isolated in 6 patients and MRSA 2 cases.

- Prolonged Catheterization
  Urinary tract infection in this study was related to prolonged catheterization > 7 days. UTI accounted for 13.6% (18) of the catheterized patients 79% (132).

- Hand Washing Practices and
  Injudicious use of gloves: A critical observation of hand washing practices was done and it was found the level of compliance with the practice was inadequate. Injudicious use of gloves and heavy use of antimicrobial in post operative cases were another important factor contributing to Nosocomial infections.

SPECTRUM OF POST-OPERATIVE NOSOCOMIAL INFECTION

- Meningitis: 30.5% (55) cases succumbed to meningitis, out of 55 only 49 had CSF culture sterile and of these 25 were due to Acinetobacter followed by MRSA (n=10), Klesbilla (n=5), Enterobacter (n=5) and E.coli (n=4).

- Wound Infection: Wound infection was observed in 22.2% (40) cases, 12 of them had undergone emergency surgery and 28 routine. Bacteria isolated from the wound aspirate were MRSA 14/40, MSSA 9/40, E.Coli 6/40, Acinetobacter 4/10 and Enterobacter 3/40 and pseudomonas 4/40. MRSA was the commonest organism in the causation of wound infection.

- Chest Infection: Chest infection was observed in 37.2% (67) patients. All 67 patients with chest infection were on ventilatory support, 36 had endotracheal intubation, 22 tracheostomies, and 18 were put on ventilator later on. Bacteria isolated endotracheal secretions and tracheal wound were pseudomonas 25/67, Acinetobacter 20/67, Klebsilla 10/67, MRSA 5/67, E.Coli 5/67 and Entrobacter 2/67. Pseudomonas was commonest organism contributing to chest infection.

- Urinary Tract Infection (UTI)
  18 out of 180 infected patients developed urinary tract infection, one hundred thirty two had an indwelling Foley’s Catheter. 18 of them had Foley’s catheter for more than seven days and they developed UTI organism isolated were E.Coli 6/18, Pseudomonas 5/18 by Acinetobacter 2/18, Entrobacter 2/18, Klesbilla 2/18 and MRSA 2/18.

- Bed Sores & Thrombophlebitis: Bed sores were observed in 5.5% (10) and thrombophlebitis 25.5% (46) patients. Diagnosis was made on the basis of clinical findings. As the wounds were with Localised ulceration, no culture was sent.

Analysis of the data revealed chest infection was the most common infection encountered in post-operative Neurosurgical patients. Acinetobacter was the most common organism in chest infection and meningitis. Pseudomonas was the common organism in chest infection. In urinary tract infection E.Coli was the most common organism. 152 out of 180 cases developed infection due to gram negative organism and 28 cases due to gram positive organism (MRSA), which is sensitive to venomycin.

- Anti Microbial Therapy: Anti-biotic used for the patients were according to the sensitivity reports.

DISCUSSION

Altered Sessorium and CSF leak has been uniformly found to be a high risk factor for post operative infection in various studies as well as in the present study. Grimmond et al. reported catheter related urinary tract infection in neurosurgical cases as 33% in females and 15% in males. He emphasized that lower rate of infection was related to a shorter duration of catheterization. All the urinary tract infection in this study were related to prolonged catheterization > 7 days and occurred 7% of the catheter patients.

IMPLICATIONS

The findings mentioned here are part of retrospective study on the incidence and prevalence of post-operative Nosocomial Infection in Neurosurgical patient. This study highlights higher incidence of postoperative infection in patients undergoing emergency surgery thus highlighting the need for extra care and precautions.

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