Klebsiella pneumoniae associated nosocomial meningitis in a patient after resection of meningioma.

Sabita Bhatta[1], Raina Chaudhary[1], Dhirendra Ayer[2].
[1]Microbiology Department, Shree Birendra Hospital. [2] Department of Neurosurgery.

ABSTRACT

Introduction: *Klebsiella pneumoniae*is a primary pathogen capable of causing urinary tract infection (UTIs), liver abscess and pneumonia in otherwise healthy individuals. However, most infections caused by *K. pneumoniae*are acquired in the hospitals and/or occur in those who are debilitated by various under lying conditions. Nosocomial infections caused by *K. pneumoniae* includeswound infections, infections of intravascular and other invasive devices, biliary tract infections, peritonitis and meningitis. *We* report a case of a 29 year old malewho developed meningitis after excision of meningioma.

KeyWords: *Klebsiella pneumonia*; nosocomial meningitis; meningioma.

INTRODUCTION

In the genus Klebsiella, Many species are associated with illness in humans: Most common are *K pneumoniae, K oxytoca and K granulomatis.*

K pneumoniae is a primary pathogen capable of causing UTIs,liver abscess and pneumoniae in a healthy people.However, nosocomial infections caused by *K. pneumoniae*includes, bacteremia, wound infections, infections of intravascular and other invasive devices, biliary tract infections, peritonitis, thrombophlebitis, urinary tract infection (UTI), cholecystitis, diarrhea, osteomyelitis, and meningitis. The presence of invasive devices, contamination of respiratory support equipment, use of urinary catheters, and use of antibiotics are factors that increase the likelihood of nosocomial infection with *Klebsiella* species [1].

A patient of meningioma who underwent excision of meningioma with cranioplasty developed CSF leakage from drain site associated with *K pneumoniae* is reported here.

CASE REPORT

A twenty nine year old male, with a history of 1st episode of seizure on July 2009, after 6 months developed 4 episodes of seizure. On January 2010,magnetic resonance imaging (MRI) was done which revealed meningioma of right frontal lobe. He underwent craniotomy with the exicision of meningioma of the right frontal lobe in the same month. At the same time patient complained of B/L loss of vision, for which fundoscopy was done and diagnosed as bilateral optic nerve atrophy. Then the patient was discharged on Tab. phenytoin 200 mg HS.

On Oct 2010, he again developed seizure for which dose of phenytoin was increased upto 300 mg HS. Then almost every month patient had repeated seizures therefore Tab. sodium valporate 400 mg was added. But the seizure continued. Therefore again MRI brain was done on Nov 2013 which revealed: recurrent right frontal lobe meningioma, large lobulated intermediate signal intensity lesion in right frontal region with infiltration of adjacent dura and superior sagittal sinus

Correspondence:
Dr Sabita Bhatta
Microbiology Department Shree Birendra Hospital
Email: bhattasabita@gmail.com

and thrombosis anterior 1/3rd of superior sagittal sinus.

On Dec 2013, patient was undertaken for near total excision of right frontal meningioma with duraplasty (surgery was stopped due to excessive bleeding). Re-exploration and SIMPSON'S grade 1 excision of meningioma with acrylic cranioplasty was done with drain in situ in the same month. Then the patient developed CSF leakage from drain site, therefore lumbar catheter placement was done for CSF drain on Dec 2013 which was removed after 5 days. Again lumbar catheter placement was done on Jan 2014 (removed after 10 days).

After removal of catheter, patient developed high grade fever (104°F) associated with headache. CSF sample was sent for culure and sensitivity, cytology and biochemistry analysis.Patient was empirically treated with Inj. amikacin 1 gm OD, Inj. Ceftriaxone 2 gm BD and Injmetron 500 mg TDS.

CSF was cultured on MacConkey, blood agar and chocolate agar. After 24 hours of incubation, mucoid lactose fermenting colonies were grown which was confirmed as *K. pneumoniae* on the basis of biochemical reaction. This strain was sensitive to doxycycline and chloramphenicol only and resistant to rest of the drugs tested as per recommendation of Clinical Laboratory Standard Institute (CLSI) guideline.

Cytology and biochemistry revealed total count = 209/mm3, neutrophils = 65%, lymphocytes= 35%, sugar 33mg% and protein 169 mg%.

Patient was treated as per sensitivity. After two weeks of treatment the patient was improved and discharged.

DISCUSSION AND REVIEW OF LITERATURE

K. pneumoniae causes both community acquired as well as nosocomial infection affecting many organs. *K pneumoniae* is a rare cause of bacterial meningitis in Europe and the United states but is relatively common in Taiwan and Korea[2,3].

K pneumoniae associated nosocomial meningitis is also very rare and is associated with neurosurgical conditions.

Nosocomial meningitis after neurosurgurical procedure mostly occurs within the first 2 weeks after the operation. One third of cases however occur after this time frame, and some cases have been reported to occur years after neurosurgery [2].

The postoperative period after neurosurgery may be complicated by non-frequent but life-threatening bacterial meningitis [4-6]. Neurosurgical patients frequently have ventricular drains, bladder and intravenous catheters that may be present for a long time. All of these factors together with type and duration of the operation can increase the chance of infection after neurosurgery.

K. pneumoniae infection is noted occasionally in nosocomial infection and most of the involved cases have a preceding neurosurgical condition[7-10].

Our patient developed meningitis caused by *K pneumoniae* who underwent repeated intervention in brain tissue. Similarly Matthijs C Brouwer et al has reported nosocomial meningitis by *K pneumoniae* in 40 year old female after neurosurgery for severe neurotrauma[11]. Shih HI et al also reported nosocomial meningitis and brain abcess in a patient with esophagealvariceal ligation in cirrhosis patients[12].

MCF Reichert et al also reported that Gram-negative bacilli the most common etiological agents causing nosocomial meningitis in a patient undergoing craniotomy [13].

Similarly Chia-Chen Chang et al also reported *K pneumoniae,* the predominante pathogen causing meningitis among the patients with neurosurgery [14].

To conclude, nosocomial meningitis is a serious condition which results in longer hospital stay and increases mortality rate due to treatment failure associated with multi drug resistant pathogens.

REFERENCES

1. Michael SD Enterobacteriaceae. In: Principles and practice of infectious diseases, 7th ed. Mandell GL, Bennett JE, Dolin R Eds. Philadelphia. Elsevier; 2010;p. 2826-7.

2. Van de Beek D, Drake JM, TunkelAR . Nosocomial bacterial meningitis. N Engl J Med 2010;362:146 – 54.http://dx.doi.org/10.1056/NEJMra0804573

3. Lu CH, Chang WN, Chang HW. Klebsiella meningitis in adults: clinical features, prognostic factors and therapeutic outcomes. J ClinNeurosci 2002; 9:533 – 8.http://dx.doi.org/10.1054/jocn.2001.1032

4. Blomstedt GC. Infections in neuro s u rgery: a retrospective study of 1143 patients and 1517 operations. ActaNeurochir (Wien) 1985;78:81-90.http://dx.doi.org/10.1007/BF01808684

5. Buckwold FJ, Hand R, Hansebout RR. Hospital-acquired bacterial meningitis in neurosurgical patients. J Neurosurg 1977;46:494-500.http://dx.doi.org/10.3171/jns.1977.46.4.0494

6. Mollman HD, Haines SJ. Risk factors for postoperative neurosurgical wound infection: a case-control study. J Neurosurg 1986;64:902-6.http://dx.doi.org/10.3171/jns.1986.64.6.0902

7. Durand ML, Calderwood SB, Weber DJ, Miller SI, Southwick FS, Caviness VS, Swartz MN. Acute bacterial meningitis in adults: a review of 493 episodes. New EnglJMed 1993; 328: 21-28.http://dx.doi.org/10.1056/NEJM199301073280104

8. Sigurardottir B, Bjonsson OM, Jonsdottir KE, Eriendsdottir H, Gudmundsson S. Acute bacterial meningitis in adults: a 20-year overview. Arch Intern Med 1997; 157: 425-430. http://dx.doi.org/10.1001/archinte.157.4.425. http://dx.doi.org/10.1001/archinte.1997.00440250077009

9. Hosoglu S, Ayaz C, Geyik MF, Kokoglu OF, Ozen A. Acut bacterial meningitis in adults: analysis of 218 episodes. Lr J Med Sci 1997; 166: 231-234.

10. Kyaw MH, Christie P, Jones IG, Campbell H. The changing epidemiology of bacterial meningitis and invasive nonmeningitic bacterial disease in Scotland during the period 1983-88. Scand J Infect Dis 2002; 34: 289-298.http://dx.doi.org/10.1080/00365540110080403

11. Joost M Costerus, Diederik van de Beek, Matthijs C Brouwer. Nosocomial meningitis caused by gas producing Klebsiella Pneumonia BMJ Case Reports 2012; doi:10.1136/bcr.11.2011.5137http://dx.doi.org/10.1136/bcr.11.2011.5137

12. Shih HI, Lee HC, Chuang CH, Ko WC. Fatal Klebsiellapneumoniae meningitis and emphysematous brain abscess after endoscopic variceal ligation in a patient with liver cirrhosis and diabetes mellitus. J Formos Med Assoc. 2006 Oct;105(10):857-60.http://dx.doi.org/10.1016/S0929-6646(09)60275-8

13. Reichert MC, Medeiros EA, Ferraz FA. Hospital-acquired meningitis in patients undergoing craniotomy: Incidence, evolution, and risk factors Am J Infect Control 2002;30:158-64. http://dx.doi.org/10.1067/mic.2002.119925.

14. Chia-Chen Chang, Chen-Hsien Lu, Chi-Ren Huang, Yao-Chung Chuang, Nai-Wen Tsai,Shu-Fang Chen, Hsueh-Wen Chang, and Wen-NengChang.Culture-proven Bacterial Meningitis in Elderly Patients in Southern Taiwan: Clinical Characteristics and Prognostic Factors ActaNeurol Taiwan 2006;15:84-91.