Crit Care & Shock (2007) 10 : 148-150

Spontaneous Escherichia Coli Meningitis in an Adult

Ashish A. Sule, Dessmon YH Tai

Abstract

***Introduction*: Escherichia coli meningitis was rarely reported in adult patients. Moreover it is very rare in an adult patient without diabetes mellitus or neurosurgical shunts. In adult patients, it carries a high mortality ranging from 27% to 90% with treatment, and 100% without treatment.**

***Case report*: We describe a 78 year old lady who presented with altered mental state and neck stiffness. Her cerebrospinal fluid analysis was consistent with bacterial meningitis and she had E. coli bacteraemia. She was treated with ceftrioxone 2 gm twice a day for 2 weeks. She also developed non-ST elevation myocardial infarction on day 3 of admission. She was treated with aspirin, low molecular weight heparin and monitored on telemetry for 3 days. She remained in hospital for 2 weeks and was discharged well.**

***Conclusion*: E. coli meningitis carries high mortality. E. coli may cause meningitis in adult patients without diabetes mellitus or neurosurgical shunts. Early diagnosis and treatment is key to good outcome as mortality without treatment is 100%.**

Key words: E. coli, meningitis, bacteraemia, mortality

Introduction

Escherichia coli meningitis has been reported rarely in adult patients. Moreover, it is very rare in an adult patient without diabetes mellitus or neurosurgical shunts. Even with treatment, it carries a high mortality ranging from 27% to 90%, and mortality without treatment is 100% [1-3].

We describe a rare case of an adult patient, without known predisposing factors such as diabetes mellitus or neurosurgical shunts, who presented with E. coli meningitis.

Case Report

Ms LCH, 78 year-old lady, was admitted on 9/04/2007 with altered mental state. She had background history of hypertension and ischemic heart disease for 20 years. She had no history of diabetes mellitus or neurosurgical operations. She had past history of pulmonary tuberculosis 40 years ago.

On examination, she was febrile (temperature 38.4 ^{0}C), blood pressure 170/90 mmHg, pulse 86/min, SaO_2 100% (via intra-nasal cannula O_2 2 L/min). She was drowsy, confused, opened eyes to call and moved her limbs spontaneously. Her pupils were 3 mm bilaterally and were reactive to light. The deep tendon reflexes were normal and her planter response was

From Tan Tock Seng Hospital, Singapore (Drs. Ashish A. Sule and Dessmon YH Tai)

Address for correspondence:
Ashish A. Sule, MD, MRCP (UK)
Registrar, General Medicine
Tan Tock Seng Hospital
11 Jalan Tan Tock Seng
Singapore 308433
Fax: 63577588
Email: ashishsule@yahoo.com

Introduction

Escherichia coli meningitis has been reported rarely in adult patients. Moreover, it is very rare in an adult patient without diabetes mellitus or neurosurgical shunts. Even with treatment, it carries a high mortality ranging from 27% to 90%, and mortality without treatment is 100% [1-3].

We describe a rare case of an adult patient, without known predisposing factors such as diabetes mellitus or neurosurgical shunts, who presented with E. coli meningitis.

Case Report

Ms LCH, 78 year-old lady, was admitted on 9/04/2007 with altered mental state. She had background history of hypertension and ischemic heart disease for 20 years. She had no history of diabetes mellitus or neurosurgical operations. She had past history of pulmonary tuberculosis 40 years ago.

On examination, she was febrile (temperature 38.4 ^{0}C), blood pressure 170/90 mmHg, pulse 86/min, SaO_2 100% (via intra-nasal cannula O_2 2 L/min). She was drowsy, confused, opened eyes to call and moved her limbs spontaneously. Her pupils were 3 mm bilaterally and were reactive to light. The deep tendon reflexes were normal and her planter response was withdrawal. There was no sinus or mastoid tenderness. Her tympanic membranes were intact. Other systemic examination was normal.

Her full blood count showed haemoglobin 11.5 g/dL, total white $22x10^9$/L, (neutrophils 89.9%, lymphocytes 2.2%, monocytes 7.9%, eosinophils 0%), platelets $337x10^9$/L. Her CRP was 127.7 mg/L and fasting blood glucose was 5.3 mmol/L. Serum electrolytes, urea, creatinine and liver function tests were normal. Arterial blood gas (intra-nasal O_2 2 L/min) showed pH 7.51, pCO_2 27 mmHg, pO_2 133 mmHg, HCO_3 21 mmol/L, SaO_2 99%. Electrocardiogram showed sinus tachycardia with rate of 102/minute.

Chest X-ray showed bilateral upper lobe fibrosis suggestive of old pulmonary tuberculosis. Ultrasound abdomen showed evidence of chronic cholecystitis with no gall stones or cholangitis. Her CT head showed bilateral chronic lacunar infarcts with no acute intracranial haemorrhage or sinus infection.

Cerebrospinal fluid (CSF) analysis showed 28 nucleated cells/uL (neutrophils 93%), protein 0.23 g/L, glucose 3.1 mmol/L (simultaneous random capillary blood glucose 7.1 mmol/L). CSF cultures, cryptococcal antigen and neurotropic viruses were negative.

She was treated with 2 doses of intravenous ceftriaxone (total 2 grams) before CSF analysis was done. Based on CSF analysis, she was diagnosed to have acute bacterial meningitis and was treated with 2 grams of ceftriaxone twice a day. Her blood cultures on 12/04/2007 grew E. coli sensitive to ampicillin, ceftriaxone, gentamicin, ciprofloxacin and cotrimoxazole. Intravenous ceftriaxone was continued. Her urine culture showed no growth. She was noticed to be more tachypnoeic on 10/04/2007. Repeat electrocardiogram showed new T wave inversion in the anterior chest leads. Her cardiac enzymes were raised and she was diagnosed to have non-ST elevation myocardial infarction. She was treated with aspirin, low molecular weight heparin, enalapril and bisoprolol. Her 2-dimensional echocardiography showed left ventricular ejection fraction 35% with regional wall motion abnormality.

Her sensorium continued to improve from day 3 of ad3mission (12/04/2007). Her repeat blood tests showed haemoglobin 10.9 g/dl, total white $9x10^9$/L (neutrophils 74.2%, lymphocytes 18.1%, monocytes 7.1%, eosinophils 0.2%), platelets $410x10^9$/L. Anaemia work up showed: serum iron 8 umol/L (normal range 10-30), transferrin 1.1 g/L (1.8-3.5), iron saturation 29% (15-45%), ferritin 356 ug/L (24-336), folate 6 nmol/L (8-30), vitamin B_{12} 431 pmol/L (133- 675). She was given folic acid replacement. She completed 2 weeks of antibiotic and was well on discharge after 3 weeks of hospitalisation.

Discussion

Acute bacterial meningitis constitutes a serious neurological disorder associated with significant morbidity and mortality. E. coli is one of the most frequent causes of some of the many common bacterial infections, including cholecystitis, bacteremia, cholangitis, urinary tract infection, traveller's diarrhoea, and other clinical infections such as neonatal meningitis and pneumonia. E. coli meningitis is not common in adults and carries high mortality [1,2].

The common practice of antibiotic therapy prior to CSF evaluation coupled with inconsistent laboratory support in developing countries makes aetiological diagnosis extremely difficult [4,5]. Prior antibiotic therapy 12 hours or more before lumbar puncture can sterilize the CSF [4,6]. The definitive diagnosis of meningitis depends on isolation of bacteria from CSF culture. However, often the CSF culture is negative.

Chan YC *et al* showed one of the criteria used to diagnose culture-negative bacterial meningitis was CSF pleocytosis with positive blood culture. Eleven out of 26 (42.3%) patients in the study were CSF culture-negative and 55% of them had received antibiotic therapy prior to CSF analysis [7]. Pandit *et al* showed that 41 out of 43 (95.5%) meningitic CSF specimens tested were culture-negative. This was due to prior antibiotic treatment [4]. In our patient with meningitis, even though CSF culture was negative, we diagnosed and treated her as E. coli meningitis based on CSF analysis and positive blood culture.

In adults, E. coli meningitis is rare but may occur in patients following neurosurgical trauma/procedures, diabetes mellitus or complicating Strongyloides stercoralis hyperinfection involving the CNS.

Conclusion

E. coli meningitis in adults is very uncommon especially if there is no neurosurgical procedure or history of diabetes mellitus. It carries a high mortality. It is important to recognise and treat these patients early as mortality without treatment is 100%.

References

1. Yang TM, Lu CH, Huang CR, Tsai HH, Tsai NW, Lee PY, Chien CC, Chang WN (2005) Clinical characteristics of adult Escherichia coli meninigitis. Jpn J Infect Dis 58:168-170
2. Mofredj A, Guerin JM, Leibinger F, Mamoudi R (2000) Spontaneous Escherichia coli meningitis in an adult. Scand J Infect Dis 32:699-700
3. Chotmongkol V, Techoruangwiwat C (2000) Community acquired-bacterial meningitis in adults. Southeast Asian J Trop Med Public Health 31:506-508
4. Pandit L, Kumar S, Karunasagar I, Karunasagar I (2005) Diagnosis of partially treated culture-negative bacterial meningitis using 16S rRNA universal primers and restriction endonuclease digestion. J Med Microbiol 54:539-542
5. Cartwright K, Reilly S, White D, Stuart J (1992) Early treatment with parenteral penicillin in meningococcal disease. BMJ 305:143–147
6. Solbrig MV, Healy JF, Jay CA (2000) Infections of the nervous system. In: Bradley WG, Daroff RB, Fenichel GM, Marsden CD (Eds). Neurology in Clinical Practice. Butterworth–Heinemann, Boston pp 1317-1351
7. Chan YC, Wilder-Smith A, Ong BK, Kumarasinghe G, Wilder-Smith E (2002) Adult community acquired bacterial meningitis in a Singaporean teaching hospital. A seven-year overview (1993-2000). Singapore Med J 43:632-636