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Case Report

Escherichia Coli Subdural Empyema Following Subdural Hygroma in Elderly Patient

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Subdural empyema of the brain is an uncommon disorder that occurs more frequently in children than in adult. Authors report a very rare of subdural empyema following the subdural hygroma after mild head injury. The exact mechanism of infection is not known. However, we have to consider subdural infection as one of differential diagnosis in elderly patient with subdural hygroma when new abnormal density lesion is developed in the subdural space.

KEY WORDS : Subdural hygroma · Subdural empyema · Head injury.

INTRODUCTION

Subdural empyema (SE) is a rare intracranial infectious disorder with high mortality. SE usually occurs secondary to meningitis, paranasal sinusitis, middle ear infection, trauma, brain surgery, or via hematogenous spread[3,8]. In particular, SE following subdural hygroma without focus of contiguous infection is extremely rare. Furthermore, SE caused by Escherichia coli in adult is hardly reported. The signs and symptoms of SE consist of headache, disturbed consciousness, signs of infection, nuchal rigidity, and seizure[8]. The treatment of SE consists of a prompt surgical evacuation of purulent materials and administration of appropriate systemic antibiotics. Also, the focus of infection identified elsewhere should be removed. However, optimal surgical management modality for the SE, between burr hole and craniotomy, is controversial[2,7,11]. In this case, the patient underwent two burr hole drainage for evacuation of the pus followed by antibiotics treatment, but we could not identify the focus of infection.

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CASE REPORT

This 79-year-old woman presented with cerebral concussion following a pedestrian traffic accident. On admission, computed tomography (CT) scan of brain revealed no abnormal findings in the intracranial space except soft tissue swelling on frontal area (Fig. 1). Fourteen days after injury, follow-up CT scan of brain demonstrated bilateral subdural fluid collection suggesting hygroma but the patient showed no neurologic deficit (Fig. 2). The second follow-up CT scan of brain showed new high attenuated and well marginated

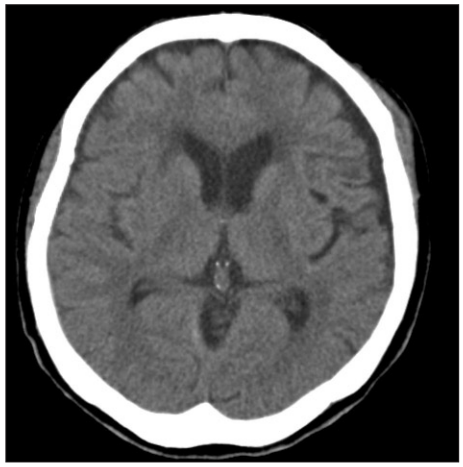

Fig. 1. Initial precontrast computed tomography scan revealing no abnormal findings except scalp swelling on left frontal area.

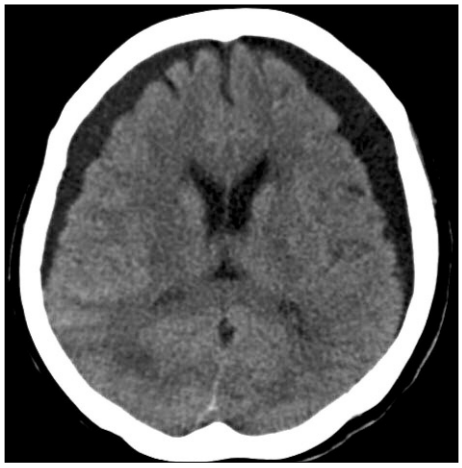

Fig. 2. Follow-up precontrast computed tomography scan showing bilateral hygromas in the both frontoparietal region.

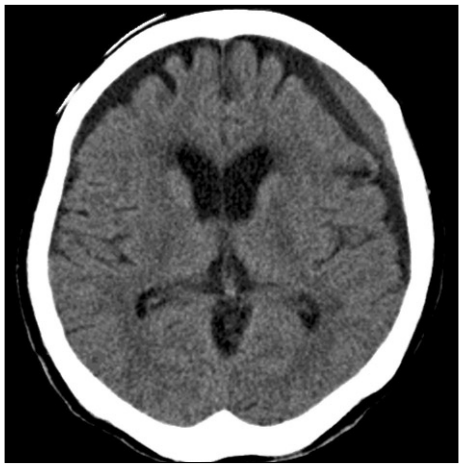

Fig. 3. Follow-up precontrast computed tomography scan showing the new high density lesion in the left subdural space.

Fig. 4. Follow-up precontrast computed tomography scan demonstrating partial resolving state of preexisting high density lesion in left subdural space.

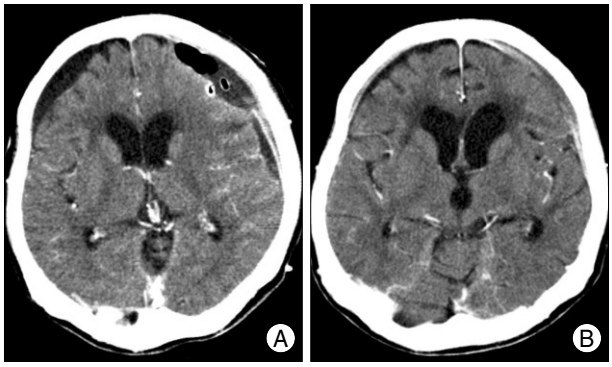

Fig. 5. A : Contrast enhanced computed tomography scan at postoperative showing meningeal enhancement and subdural empyema in left frontoparietal area and drainage catheter placed in the subdural space is noted. B : Follow-up contrast enhanced CT scan after 6 weeks of antibiotics therapy demonstrating decreased meningeal enhancement and subdural empyema.

lesion in the preexisting left subdural hygroma (Fig. 3). The authors have considered it as small bleeding within the hygroma. In a few days, the patient presented with mental deterioration, high fever, and general weakness. The CT scan at that time showed partial resolving state of preexisting subdural hemorrhage (Fig. 4). A burr hole trephination and drainage was performed on the left side. Intraoperatively, we identified the external membrane beneath the dura mater was very thickened and after incising the membrane, unexpected yellowish-white colored material was gushed out from subdural space. We made another burr hole on the frontal area and irrigated the subdural space until the purulent materials became clear with isotonic solution mixed antibiotics. Escherichia coli was cultured from the specimen. Postoperatively, the clinical status of patient was improved. Following surgery, we could not find any extracranial focus of infection. Follow-up CT scan of brain has revealed the progressive improvement of empyema during and after antibiotic treatment (Fig. 5). The patient was fully recovered after systemic antibiotics therapy for 6 weeks.

DISCUSSION

SE is an intracranial collection of pus between dura mater and arachnoid mater and considered a rare and critical disease. SE with preexisting chronic subdural hematoma was reported uncommonly[3,6]. However, SE following subdural hygroma after minor head injury has not been reported yet. In literature review, mortality from SE is high, ranging from 15 to 40%[5,10]. However, early detection of SE, early removal of the focus of infection, drain of subdural pus, and appropriate systemic antibiotic therapy might improve mortality and morbidity rate. SE usually observed in infants and young children in the postmeningitis period. In adults, parameningeal factors such as otogenic infection or parasinusitis are mostly dominant[11]. It may also be occurred by posto-

perative infection and secondary to hematogenous spread[3,4]. In recent study, reported the rate of SE after craniotomy was 0.043%[8]. SE was located most often over the cerebral convexities and involved the interhemispheric space less frequently. Yilmaz et al.[11] reported pathogens from subdural pus and cerebrospinal fluid cultures of 28 SE patients. The most common causative organisms of SE were staphylococcus and streptococcus. Less frequently, Hemophilus influenza, Escherichia coli, Klebsiela pneumoniae, and anaerobes were isolated. Among the 28 patients, Escherichia coli were obtained from 3 patients who were all under the age of 2.5 month. The signs and symptoms of SE consist of headache, vomiting, nuchal rigidity, seizure, disturbed consciousness, and signs of infection[8]. In blood test, the erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and peripheral white blood cell count are elevated.

The diagnosis of SE can be made by contrast enhanced CT scan or MRI. However, CT scan findings may be subtle early in the disease and may not be diagnostic[9]. The gadolinium contrast enhanced MRI would be the diagnostic study of choice whenever an intracranial infection is suspected. Diffusion weighted MRI may also be a method of reliable diagnosis[11]. In this case, the authors missed contrast enhanced CT scan or MRI of brain when the patient was febrile. Treatment consists of antibiotics, surgical intervention, and eradication of the primary infected focus. Administration of local antibiotics is usually not necessary[1]. Controversy exists concerning surgical management between burr hole and craniotomy[5]. Yilmaz et al.[11] presented that the success rate was higher in craniotomy than burr hole drainage. On the other hand, some argue that the burr hole drainage alone is enough for complete removal of SE[2,6]. In general, burr hole is adequate if pus is thin and there is not interhemispheric collection. Burr hole procedure can avoid postoperative complication such as cerebral edema, cerebral infarct or hemorrhage, and osteomyelitis. However, if the pus is thick or an interhemispheric collection is present, a craniotomy is recommended. In this case, burr holes were made on the left frontal and parietal area and provided the proper route for evacuation of pus.

CONCLUSION

In this case SE was missed by CT scan before surgery because the newly developed high density lesion in the subdural space was considered as a subdural hematoma. Our case suggests that SE should be ruled out when clinical symptoms and laboratory values of CBC or CRP were indicated the infection in elderly patient with preexisting subdural hygroma.

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