First global case of brain abscess caused by Kluyvera

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Abstract: In 1956, a new germ called Kluyvera was first described by Asai and Okurama. This gram-negative bacterium with polar flagella has never previously been reported in CNS infections until the present time. *(p112-115)*

Key words: *Brain abscess and Kluyvera*

Introduction

Kluyvera is an infrequent opportunistic pathogen affecting both immunocompromised and immunocompetent individuals. We present a patient with a brain abscess presenting to Saint George Hospital, Lebanon 36 days post motor vehicle accident in Liberia, Africa.

Case Report

A 62-year-old female patient had a motor vehicle accident that resulted in a loss of consciousness of 30 minutes duration as well as nasal bone fracture, zygomatic and maxillary bone fractures, sphenoid sinus haematoma, fronto-orbital depressed bone fracture (Fig. 1) and a right knee fracture.

The patient was received in a health care facility in Liberia and was treated with primary care that consisted of suturing the subcutaneous tissue and wounds over the forehead. The following day she was transported to Lebanon, where the fronto-orbital fracture was fixated with metallic wires and the knee fracture was treated surgically with prosthesis of the tibial plateau. Bilateral hip fractures were managed conservatively.

Two days after this, the patient started to complain of episodic unsupportable frontal headache. The patient's family also noticed a progressive state of disorientation. She was referred to a health care centre where a brain computed tomography (CT) scan showed the presence of a huge right fontal brain abscess (Fig. 3).

She had no fever, headaches, nausea or vomiting. Soon after the radiological discovery she was admitted to a central hospital for further management. Upon her presentation at the emergency room, the patient was confused and disoriented; left upper limb weakness of 3/5 motor strength was noted.

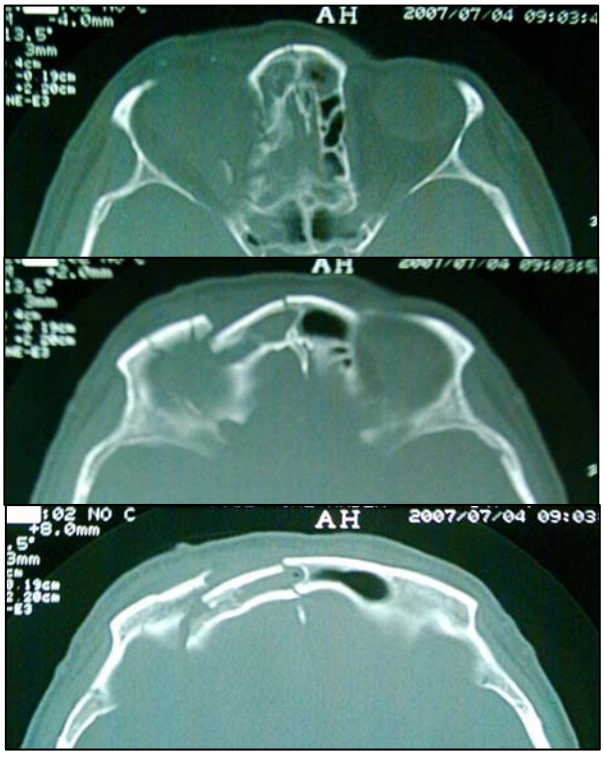

Figure 1 - A bone window of the sphenoid sinus haematoma and fronto-orbital depressed fracture

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Figure 2 - First CT scan 2 days post accident showing a frontal depressed bone fracture with cortical injury and a frontal haematoma with perilesional oedema.

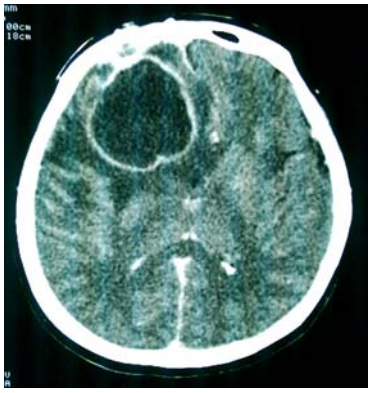


Figure 3 - Brain CT with contrast done 1 month post accident and after the reparative surgery revealing a brain abscess with mass effect characterized by a midline shift

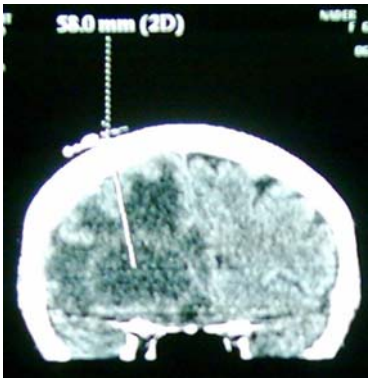


Figure 5 - CT guided localization of the fontal abscess

As a treatment plan, surgery was scheduled and empiric anti-biotherapy was started with ceftriaxone 2g IV every 12 hours and metronidazole 500 mg IV every 6 hours. The infectious disease team added vancomycin in order to cover

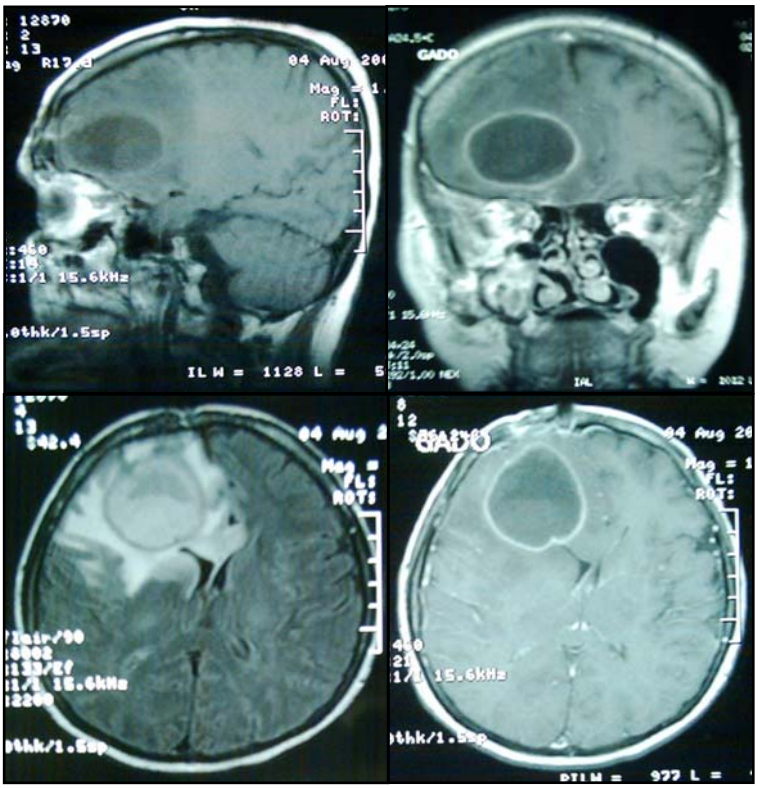


Figure 4 - Gadolinium contrasted brain MRI

the expected staphlylococcus.

A brain magnetic resonance imaging (MRI) was performed preoperatively to study the lesion. It revealed a 4.5 x 4.5 x 3 cm brain abscess in the right frontal lobe (Fig. 4).

Phenytoin and metylprednisolone were also administered in order to prevent any epileptic crisis and decrease brain oedema.

Two days post admission, after completing routine work up, a CT scan guided stereotaxic localization assisted the neurosurgeons in accurate drainage of the lesion (Fig. 5). Under general anaesthesia, a burrhole craniotomy was created, the dura matter coagulated, then punctured and the abscess was suctioned; 32 ml of brownish milky pus was drained and a specimen sent for gram stain, culture and polymerase chain reaction molecular study.

An external drainage to a ventricular derivation system was inserted, and then removed 72 hours later, after performing the first postoperative CT scan, and providing complete drainage of the abscess cavity.

The gram stain turned out negative. No organisms were seen but many white blood cells were noted. A difficult to culture gram-negative fermenter bacilli was expected and

results yielded 3 days post incubation, a Kluyvera API-20E-530-4-153, for the first time cultured in the world from an abscess of the central nervous system.

The microorganism was sensitive to piperacillin, tazocillin, cefuroxime, cefotaxime, ceftriaxone, ceftazidime, cefipine, aztreonam, imipinem, gentamycin, amikacin, trimethoprime/sulfamethxazol, ofloxacin and ciprofloxacin.

Accordingly, vancomycin was stopped and the treatment resumed on cefriaxone for 10 weeks duration, assuring a smooth postoperative neurological course. Postoperatively, five brain CT scans were done (Fig. 6).

The patient was discharged home after a complete month of intravenous anti-biotherapy (ceftriaxone). Computed tomograhy scans were regimentally studied on a outpatient follow-up basis.

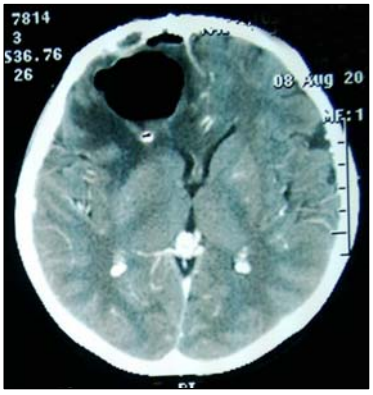
Discussion

The first scientists to propose the genus Kluyvera were Asai and Okuyrama, in 1956. They reported a group of gram-negative bacteria with polar flagella that produce alpha-ketoglutaric acid during fermentation of glucose.[1]

Farmer and coworkers in 1981 proposed the reclassification of the organism as a newly described genus within the family of enterobacteriaceae, after isolating 100 gram-negative, oxidase-negative fermentative bacteria whose biochemical reactions were almost identical to those defined by Asai and Okurama.[2]

The genus Kluyvera has recently been divided into 4 species by deoxyribonucleic acid-deoxyribonucleic acid hybridization. Kluyvera ascorbata is the type most frequently isolated in clinical specimens and the type

Figure 6 - All control slides are CT contrasted phases, shown at the same cut; level of the third ventricle



Day 2 postop - the drain in place within the abscess cavity. The abscess totally drained and air was present with no fluid signal inside the cavity.

Week 2 postop - Decrease in the cavity volume, while minor compression was noted on the right frontal horn.

Week 4 postop - Further decrease in the cavity volume (3 cm overall diameter). A residual mass effect still on the falx cerebri.

Week 6 postop - Total disappearance of the mass effect.

Week 9 postop - Total disappearance of the cavity. Antibiotics were continued for 1 more week.

species of the genus. Kluyvera cryocrescens is a less frequently isolated form of human specimen being reported more commonly as an environmental isolate. Kluyvera Georgiana and Kluyvera cochleae (previously known as K intermedia or enterobacter intermedius) represent a heterogenous rare subtype.[3]

K ascorbata can be differentiated from K cryoscrescens by its ability to grow at 5 degress C in a refrigerator, smaller zones of inhibition around carbenicillin and cephalothin disks and positive ascorbate test.[2,5]

According to a recent review, cultures of Kluyvera have been isolated from stool, urine, blood, skin wounds, sputum, lung tissue, peritoneal fluid, gallbladder fluid, tracheal aspirate, urethra-rectal fistula, mediastinal abscess, intra-abdominal abscess and finger abscess.[4]

Conclusion

We present the first case of a brain abscess caused by Kluyvera, which we believe to be the first case reported in the literature. This unique case was successfully managed in Lebanon without any significant sequelae.

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