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Acalculous Cholecystitis and Intermittent Heart Block Complicated by Septic Shock - A Rare Case Report

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ABSTRACT

We report a case of nine year old boy, with unremarkable past medical history, who presented to the emergency department for acute abdominal pain, fever, generalized fatigue and seizure. Upon presentation, the patient had a normal sinus heart rhythm, progressively he developed septic shock with a complete atrioventricular block, and also he was found to have an acalculous cholecystitis. Only medical treatment for septic shock was initiated and intravenous antibiotics were given; fortunately, the patient regained his normal heart sinus rhythm and rate, and cholecystitis cured. Special attention must be given to patients with acute cholecystitis and electrocardiographic changes. Acute cholecystitis is a treatable cause of a newly diagnosed atrioventricular block, thus treatment of cholecystitis should not be delayed.

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INTRODUCTION

Sepsis is defined as a life-threatening organ dysfunction caused by a deregulated host response to infection (1). It is a leading cause of mortality worldwide. Sepsis can progress after organ dysfunction to severe sepsis, which can also progress, after hypotension to septic shock (1).Atrioventricular block (AVB) is a type of bradyarrhythmia that refers to a conduction delay or interruption of the impulses generated in the atrium before they reach the ventricles. It can be transient or permanent (2), and the cause can be anatomical or functional disruption of the conduction system (3). Treatment goal is maintaining the cardiac output sufficient for an adequate tissue perfusion (4). Third degree AVB is characterized by independent atrial and ventricular activities (5); it requires treatment (resuscitation, treatment of reversible causes, monitoring of progression) and pacemaker insertion (6), except in asymptomatic patients (2 in 100,000 persons) where only pharmacotherapy is needed (4). Acute Acalculous Cholecystitis (AAC) can be defined as an acute inflammation of the gallbladder without evidence of gallstones or biliary sludge (7, 8, 9). It is a rare entity but carries a high mortality risk, and has a poor prognosis (10). The exact cause is unknown, but it has been hypothesized that some factors as bile stasis, sepsis, gallbladder ischemia or cardiovascular disease can contribute to its development (8, 11). Many complications can result such as multiple organ failures, prolonged hypotension, gangrenous gallbladder, septicemia, visceral arterial hypoperfusion and heart failure (10). Often, the treatment of acalculous cholecystitis is surgery: cholecystectomy (13), however, nonsurgical management: antibiotics may be a good alternative, but the studies about it were very limited and done on elderly patients (13). So, it is important to keep in mind that unexplained sinus arrhythmia and bradycardia in a patient with abdominal pain should alert the possibility of cholecystitis and sepsis, and the management should be rapid to reduce the complications and the side effects (5).

CASE REPORT

We report a nine year old boy, with unremarkable past medical and surgical history, presented to emergency department (ED) of Rafic Hariri University Hospital RHUH for two days history of undocumented fever, rhinorrhea, and a worsening diffuse abdominal pain, with one day history of severe non projectile non bilious vomiting and two episodes of seizures. The seizure was of brief duration; few seconds, of generalized tonic-clonic

movements associated with loss of consciousness, drooling, but no post-ictal phase. The patient didn't pass stools for 2 days but he doesn't recall obstipation. He had no headache, no photophobia, no history of head trauma, no sick contacts at home, and the patient was able to attend daycare the day his illness started.Upon presentation to ED, patient was conscious, cooperative, oriented, but looking ill, pale, and lethargic, with frequent episodes of non-bilious nonprojectile vomiting. Vital signs were within normal range: patient was afebrile in the ED. Four episodes of seizures occurred in the ED, as those described by the parents: generalized tonic clonic, lasting few seconds, associated with alteration in the level of consciousness and drooling with no post-ictal phase, and regaining normal level of consciousness after each episode. There were no meningeal signs, no muscle weakness and no sensory deficits. On the heart auscultation, he had regular S1, S2 with normal femoral pulses, and warm extremities. On lung auscultation, he had good bilateral airway entry. The abdomen was nondistended, soft with diffuse tenderness, and mild rebound tenderness mainly in the right upper quadrant. Laboratory studies revealed: WBC 25000 cells/L, Neutrophils 80%, Lymphocytes 13%, Na 132 mEq/L, K 4.1 mEq/L, Cl 98, CO2 17, SGOT 28 U/L, SGPT 25 U/L, Alk Phos 197 U/L,Albumin 30 g/dl, GGT 12U/L, Amylase 37 U/L, Lipase 44 U/L, Troponin 0.09 ng/mL, Ammonia 40 mcg/dl . Surgery team was consulted for possible surgical abdomen, and CT abdomen was done: it showed thick edematous wall of the gallbladder with possible cholecystic fluid, free fluid was seen in the perihepatic, intrahepatic, right perinephric and pelvic region. Rule out liver congestion due to possible cardiac cause. Findings go with acalculus cholecystitis. No need for acute surgical intervention. Neurologist opinion was to start on Phenytoin after these five seizures episodes and after doing CT brain with contrast and which revealed normal findings, then LP was requested but parents refused for personal reasons. After eight hours later, the patient developed sudden bradycardia reaching 35 bpm, hypotension 64/30 mmHg, with normal level of consciousness; during this period fortunately, patient was still cooperative and oriented but had cold extremities. Progressively, he became oliguric. Two IV boluses were given as for 20cc/kg each one, and patient was transferred to PICU. Upon admission, his ECG showed a third degree AVB (Figure 1); he was given atropine (0.02 mg/kg) once and his heart rate increased to 60 bpm, Chest X-ray was normal without cardiomegaly.

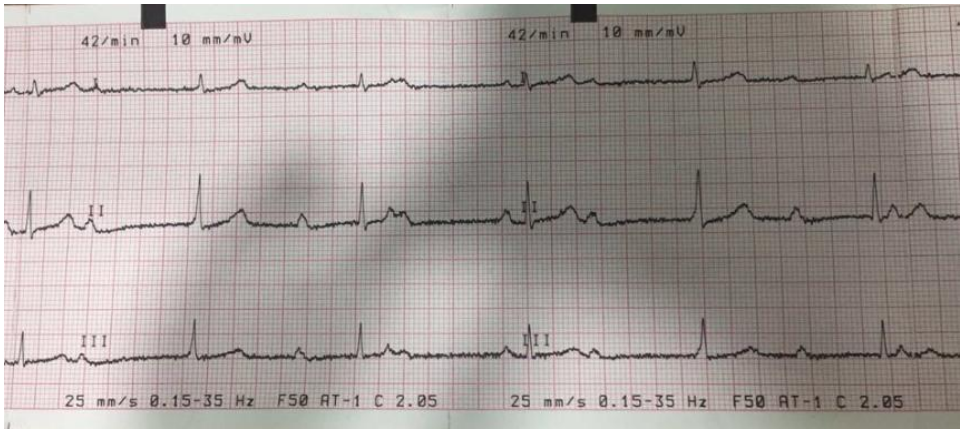

Figure 1: 3rd Degree AVB

A 2nd ECG showed a second degree AVB, Mobitz type 2 (Figure 2).

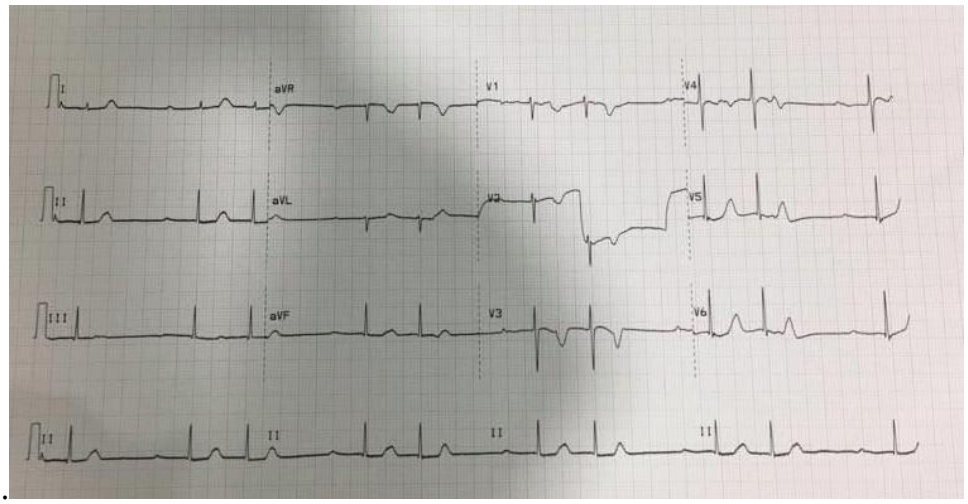

Figure 2: 2ndDegree AVB

Cardiologist opinion after doing trans-thoracic echocardiography which was normal is to start patient on Dopamine (10 mcg/k/min) after which blood pressure normalized. Broad spectrum IV antibiotics were initiated: Vancomycin, Ceftriaxone and Metronidazole. Phenytoin was stopped by the neurologist second day because convulsions are most probably syncopal episodes occurring after vomiting versus the AVB itself. During his stay in the Hospital, patient was kept on dopamine for 3 days, ECG was repeated several times and showed 2nd degree AVB Mobitz 2, then after one week of treatment, bradycardia started to resolve and patient regained his normal heart rhythm and rate. Unfortunately, patient complained of persisted abdominal pain, so Ultrasound abdomen was repeated to rule out hepatitis, congestion and hypoalbuminemia also to exclude acute cholelithiasis cholecystitis which

could be correlated to the patient's clinic. Patient's condition started to improve gradually. Follow up ultrasound showed complete resolution of the thickened edematous wall with no more pericholecystic fluid. Cardiology wise the Doppler echocardiography was normal, ECG done on daily basis and the sinus rhythm was regained after one week of antibiotics treatment. Neurological wise the EEG was normal and the anti-epileptic treatment was discontinued. Infectious wise the Widal test and blood culture were negative which excludes the possibility of typhoid acalculous cholecystitis and Wright was also negative, and urine culture showed no growth. Patient continued seven days of Vancomycin that was discontinued after negative blood culture and ten days of ceftriaxone and metronidazole. Patient was discharged home on no treatment. Laboratory findings upon discharge revealed: WBC 12.2 cells/L, Neutrophils 53%, Lymphocytes 30%, Hemoglobin 11.9 g/dl, Hematocrit 38.1%, Platelets count 521,000 cell/microL, MCV 76 fL, Na 135 mEq/l, K 4.3 mEq/L, Cl 101, CO2 20, Creatinine 0.48 mg/dl, BUN 18.1 mg/dl, Calcium 9 mg/dL, Phosphorus 4.4 mg/dL, Magnesium 2.1mg/dl, CRP 6.2 mg/dl, SGOT 26.9 U/L, SGPT 17.9 U/L, GGT 8.6 U/L, Alkaline Phosphatase 136 U/L, Bilirubin 0.06/0.03 mg/dl Total/Direct respectively. So we are dealed with a case of septic shock complicated with AVB and acalculous cholecystitis.

DISCUSSION

The ACC, common in older age group, but it is a rare entity in children, so an underlying etiology must always be revealed. One of them can be sepsis and subsequently septic shock which may be the cause of ACC in our patient. Some cases were reported, showing a cardio biliary reflex secondary to sepsis or septic shock caused by many pathogens, mostly Salmonella group B in children (18), which in general are asymptomatic, but in some circumstances, can cause enteric and cardiac symptoms that are resolved by the treatment of the main cause by antibiotic agents (18). Our patient, in addition to his ACC, complained of a complete AVB. Many studies have shown relation between ACC and cardiac arrhythmia, and this is explained in the literature by the cardio biliary reflex (14, 17). Electrocardiographic changes (bradycardia, T wave inversion, ST depression or elevation) in patients with cholecystitis can exist and are described by O'Reilly and Krauthammer in 1971 (12, 14, 15, 16). The cardiac changes resolve after cholecystectomy (14), or few days after antibiotherapy and medical treatment due to the reduction of the inflammation (12, 17). The reason of these changes is thought to be a vagal nerve mediated cardio-biliary reflex (14, 16). Vice Versa, the

cardiovascular disorders can be associated with hypovolemic state that can cause ischemic damage and inflammation of the gallbladder (7). The mechanism of this interaction between the heart and the gallbladder is not clear, but 2 hypotheses exist: The first hypothesis lays stress on distention of the bile duct that may reduce the coronary artery flow, and results in cardiac bradyarrhythmias (12). The second one emphasizes that a coronary vasospasm caused by vagal nerve mediated reflex can exist (12). As well known, the symptomatic complete AVB must be treated with pacemaker placement, and in another part, the ACC complicated with cardiac block, must be surgically treated, but in our case, patient recuperated spontaneously without any surgical intervention, only by managing the septic shock, which was the "cause" of both complications. These results, shown in our case, cannot be generalized as all the previously reported cases are few and were treated surgically or with a pacemaker placement, but observation worth it while not having a hemodynamic instability.

CONCLUSION

Septic shock, ACC and AVB can be correlated together. Biliary stasis occurring during septic shock may result in ACC which via the cardio biliary reflex and can cause AVB. Treatment of initial cause can resolve the complications without any additional interventions. We recommend other studies should be done and many other cases have to be reported, to standardize this management.

CASE REPORT APPROVAL

The case report was approved by the research and ethical committee of the Lebanese University-Faculty of Medical Sciences.

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