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Case Report
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Is Sedentary Lifestyle Leads to Multiorgan Dysfunction Syndrome with Septic Shock due to Urinary Tract Infection in an Overweight Male Child? A Single Case Report

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Abstract

Sedentary lifestyle and Physical Inactivity (PI) are two of the most important modifiable endangerments for all-cause mortality around the world. The pandemic crisis, combined with a halt to institutional activities, has made things worse for everyone. Throughout the year, children are suffering at every stage of their development. We found a male, overweight child who did not complain about any symptoms regarding his Urinary Tract Infection (UTI) somewhat engaged with electronic devices in the maximum time of the day throughout the lockdown period. It resulted in Sepsis followed by Septic Shock and Multiorgan Dysfunction Syndrome (MODS). Fortunately, he was saved by proper and timely management.

This case highlights the rarity of UTI in the male gender and its consequences. It also shows that the patient's complications were caused by risk factors such as being overweight.

Keywords: Sedentary lifestyle; Multiorgan Dysfunction Syndrome; Septic Shock; Urinary Tract Infection; Male Child

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Abbreviations

UTI: Urinary Tract Infection; MODS: Multiorgan Dysfunction Syndrome; Inj: Injection; CBC: Complete Blood Count; ICT: Immunochromatographic Test; C/S: Culture and Sensitivity; CRP: C-Reactive Protein; CSF: Cerebrospinal Fluid; R/M/E: Routine & Microscopic Examination; PI: Physical Inactivity; PA: Physical Activity; T2DM: Type 2 Diabetes Mellitus; ICU: Intensive Care Unit; CVD: Cardiovascular Disease; COVID-19: Coronavirus Disease 2019

Case Presentation

A 12 years 6-month-old male child was admitted to our hospital on September 09th, 2021 with a history of burning sensation during micturition for 20 days, lower abdominal pain for 7 days, and fever for 5 days, and neck pain for 2 days.

According to the patient's mother's statement, he was relatively well 20 days back when he developed burning micturition, which was associated with lower abdominal pain and spontaneously subsided a few days later. He has traveled to Cox's Bazar one week back. After returning, he developed a high-grade fever, continuous in nature, subsided by taking medications, and again recurred; the highest-recorded temperature was 104° F. He had a history of COVID-19 one month back and was cured without any complications. He is also obese and has led a sedentary lifestyle for the past few years, and is highly dependent on electronic devices, especially cellular phones. The lockdown of educational institutions has made the situation more vulnerable.

However, the fever was associated with severe neck pain for the last 2 days and lower abdominal pain for 5 days. He was admitted with these complaints in a private hospital. There he was treated with Inj. Ceftriaxone and Inj. Amikacin and Tab. Paracetamol. Investigations were done (CBC, Blood C/S, Urine R/E with C/S, ICT for *Salmonella*, ICT for Dengue, ICT for Malaria, Chest X-Ray), which was unremarkable. As the patient's condition was not improving, they came to our hospital for better management.

After arrival, we found the patient was febrile; the temperature was 102° F, height 176 cm,

weight 73 kg and BMI was 23.5 kg/m^2 (at 96th centile). Besides, he was conscious and cooperative; neck stiffness and suprapubic tenderness were present. His vital parameters were normal. Examination of other systems of him was unremarkable. After arrival, we diagnosed him as a case of Urinary Tract Infection (UTI) with suspected Meningitis and treated him with Inj. Ceftriaxone in meningitic dose and Inj. Amikacin.

On the following day patient suddenly deteriorated, developed hypotension, tachycardia, low pulse volume, less urine output, and altered level of consciousness. Immediately patient was shifted to Medicine Intensive Care Unit (ICU), and the antibiotic changed to Inj. Meropenem and Inj. Vancomycin. Inj. Acyclovir, Inj. Dexamethasone and Inotrope were also added.

CBC, CRP, Procalcitonin, S. Electrolytes, and Troponin I, Urine R/M/E with C/S, and CSF study were done here. CSF study was unremarkable, Troponin I was >1000 IU/l, Procalcitonin was 85.3 ng/ml, CRP was 34.93 mg/l, and there was also raised APTT, FDP, and S. Creatinine levels. An ABG reveals Respiratory Alkalosis. Besides, S. Lipase, urine amylase, and USG of the whole abdomen were normal. An Echocardiography was done, which revealed an Ejection Fraction (EF) of 38%. So, our subsequent provisional diagnosis was Septic Shock with Multiorgan Dysfunction.

A medical board was arranged with medicine, pediatrics and neuro-medicine consultants on September 11th at Medicine ICU. The patient was also reviewed by a Cardiologist there. Tab Spironolactone, Ivabradine was added. Antibiotics were changed to Inj. Piperacillin-Tazobactam and Inj. Levofloxacin on September 12th according to sensitivity, as urine C/S revealed the growth of *E. coli* and there were plenty of pus cells in urine R/M/E.

After 3 days patient became stable, inotrope tapered gradually, and then discontinued. After that, the patient was shifted to a cabin with a regular diet and ongoing treatment. Review of investigations done which reveals EF 60% on echocardiography. In addition, CRP, S. Electrolytes, and S. Creatinine levels became normal. We decided to continue the antibiotic for total 14 days and cardiac follow-up after 1 month. The patient has been discharged with follow up plan after antibiotic completion with the final diagnosis of obesity with septic shock with Multiorgan Dysfunction Syndrome due to Urinary Tract Infection.

Discussion

Physical Inactivity (PI) is linked to metabolic abnormalities in the body, for-instance poor glucose metabolism, which increases the threat of Cardiovascular Disease (CVD) significantly Mayer-Davis et al. [1]. The fact that our patient has a low EF and a high Troponin I level, both related to cardiac issues, adds to this data. Furthermore, alarming increases in the prevalence of T2DM in children and young adults are partly due to an unhealthy lifestyle that encourages PI and the intake of low-nutrient diets [2].

To investigate the effects of persistent PI on glucose metabolism in adulthood, 3,596 Finnish children (baseline age, 3 to 18 years) were followed for 31 years in a longitudinal study [3]. Those who increased Physical Activity (PA) (relative risk, 0.47; 95% CI, 0.29-0.76) or stayed persistently active had a reduced relative risk of having abnormal glucose metabolism at follow-up (0.70; 95% CI, 0.51-0.97) than those who were habitually physically inactive. Individuals with diminished PA, on the other hand, were at a similar risk (relative risk, 0.93; 95% CI, 0.66-1.36) as those with persisting PI (relative risk, 0.93; 95% CI, 0.66-1.36) [4,5]. Thus, it has the potential to harm our urinary system, just as it did in our instance, where we experienced reduced renal function.

Both bacterial and viral illnesses are defended against by PA [6-9]. But regrettably, the baby had been so inactive in his daily activities for the past year and a half that he did not empty his urinary bladder on a regular basis and instead sought to keep it for as long as he could. *E. coli* caused a bacterial infection in his urinary tract as a result of this.

Furthermore, Multiple Organ Dysfunction Syndrome (MODS) is the clinical result of a dysfunctional inflammatory process generated by clinically numerous circumstances, with invasive organ support as the fundamental component of management. It is a systemic response that necessitates a lengthy stay in the Intensive Care Unit (ICU). The patient in our study was likewise hospitalized in the ICU for 14 days. A MODS also has a high mortality rate, which varies depending on how many organs are affected. Organ collapse is no longer thought to be an all-or-nothing situation, but rather a spectrum of organ malfunction that leads to clinical organ failure El-Menyar et al. [10]. So, we tried to recover him with our best possible support in no time. Unfortunately, the patient had a history of COVID-19 too. This could be one of the contributing causes to the deterioration of the situation [11].

The rarity of this 'UTI in man' set this case apart from the other UTI instances that were common as a result of the comorbid condition.

Conclusion

This pandemic cost numerous lives in this world and affected our way of life. Unfortunately, unnoticed and late treatment can develop such grievous conditions. As a result, it is also essential to pay attention to the minor symptoms. Ultimately, parents should be aware of predisposing variables such as their child's sedentary behavior and seek to enhance their physical activity as much as possible to avoid the aforementioned situations. At the same time, it is crucial to keep in the physician's mind that decision making is a critical and time-sensitive matter when dealing with comorbidities.

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