Air Medical Journal 38 (2019) 223–227

Contents lists available at ScienceDirect

Air Medical Journal

journal homepage: http://www.airmedicaljournal.com/

Case Report

It's Just the Flu

Sarah Fabiano, MD, FAAEM, FACEP [1]*, Matt Bicknell, CFRN [2]

[1] Greenville Health System, Simpsonville, SC
[2] AirMed Regional, Greenville, SC

According to the Centers for Disease Control and Prevention (CDC), the 2017-2018 influenza season had a significant impact on public health. Particularly the influenza A, H3N2, and H1N1 subtypes were found to be the most common from samples taken and reported. Not only were there a significant amount of hospitalizations, but also the mortality for the 2017-2018 season was higher than recent years. The pediatric mortality was reported to be 180 deaths.

Influenza itself is usually a self-limited illness that consists of fever, myalgias, arthralgias, and cough. The burden of disease can be severe in vulnerable populations, such as the immunocompromised, the elderly, and the very young. Vaccinations against influenza can help to reduce the burden.

In South Carolina, the 2017-2018 flu season was particularly devastating. As of the beginning of September 2018, there have been over 4,000 reported influenza cases requiring hospitalization, and 292 confirmed deaths related to the flu. According to the CDC, the rate of death from influenza and pneumonia was above the epidemic threshold for 16 consecutive weeks.

Case Report

On February 10, 2018, a 16-year-old previously healthy female presented to the emergency department with complaints of chest pain. She had just completed a full course of oseltamivir and was not vaccinated against the flu. The patient was tachycardic with a heart rate in the 130s and was normotensive; her core temperature was 35°C. She was alert and oriented × 3; had a Glasgow Coma Scale of 15; and was noted to be cool to the touch, diaphoretic, and appeared unwell. According to her parents, she had no significant past medical history and had just finished the medication for the flu. She complained to her parents of chest pain and feeling slightly short of breath, so they brought her to be evaluated. Initially, the provider thought that this could be sepsis from influenza-related pneumonia. Laboratory values were sent stat, including a lactic acid, a respiratory pathogen panel, a basic metabolic panel, and a complete blood count. Intravenous fluids were started, and empiric antibiotics were ordered. The patient's blood pressure began to decline, and a norepinephrine drip was started. A chest x-ray was completed quickly and was normal (Fig. 1). The provider ordered an electrocardiogram and troponin; the electrocardiogram (Fig. 2) showed tachycardia and diffuse ST elevations. The troponin I level was 4.04. The provider immediately suspected that this was the feared complication of influenza myocarditis and that the patient may be in cardiogenic shock.

The pediatric intensive care unit was contacted at the tertiary center associated with this hospital. During this time, the patient continued to decline; vasopressors were changed from Levophed Pfizer (New York, NY) to an epinephrine drip. The patient was intubated; oxygen saturation was unreadable because of poor perfusion. There were no peripheral pulses, but the patient had a heart rate in the 130s on auscultation. The emergency provider suggested that extracorporeal membrane oxygenation (ECMO) may need to be initiated at the main hospital.

Because of the weather, air transport could not be provided to the main hospital. The critical care ground crew and the pediatric intensive care unit team came to the outlying hospital to get the patient. Once at the main hospital, the patient had an episode of bradycardia, and cardiopulmonary resuscitation was initiated. A stat bedside electrocardiogram was obtained, and the patient was found to have an ejection fraction of 30%; the patient continued to decline despite maximal medical therapy. Repeat electrocardiograms were completed the same day, and the final electrocardiogram estimated the ejection fraction to be between 2% and 4%. The patient had another episode of extreme bradycardia, and cardiopulmonary resuscitation again was initiated. The decision was made to place the patient on ECMO.

The patient was cannulated and placed on venoarterial ECMO. She was transferred to the adult intensive care unit service. The patient also had to return to the operating room for possible bleeding but was found to only have oozing from the sternum. Discussion was started with another tertiary center with transplant capabilities to accept this patient for consideration of a possible heart transplant. The facility accepted this patient, and the coordination of a transport team and service began. Because the patient was significantly ill and time was a factor, it was decided to use the fixed wing service associated with the hospital.

The flight team accepted the transfer, and care was also coordinated with the ground team to assist in bringing the patient to the local airport (Fig. 3). The flight team came bedside to assess and assist in the transfer of the patient. The team consisted of a critical care nurse and a critical care–trained paramedic. The perfusionist and the critical care attending also went with the patient (Fig. 4).

* Address for correspondence: Sarah Fabiano, Greenville Health System, 6 Birchall Lane, Simpsonville, SC 29681
E-mail address: sfabiano@ghs.org (S. Fabiano).

1067-991X/$36.00

https://doi.org/10.1016/j.amj.2019.02.003

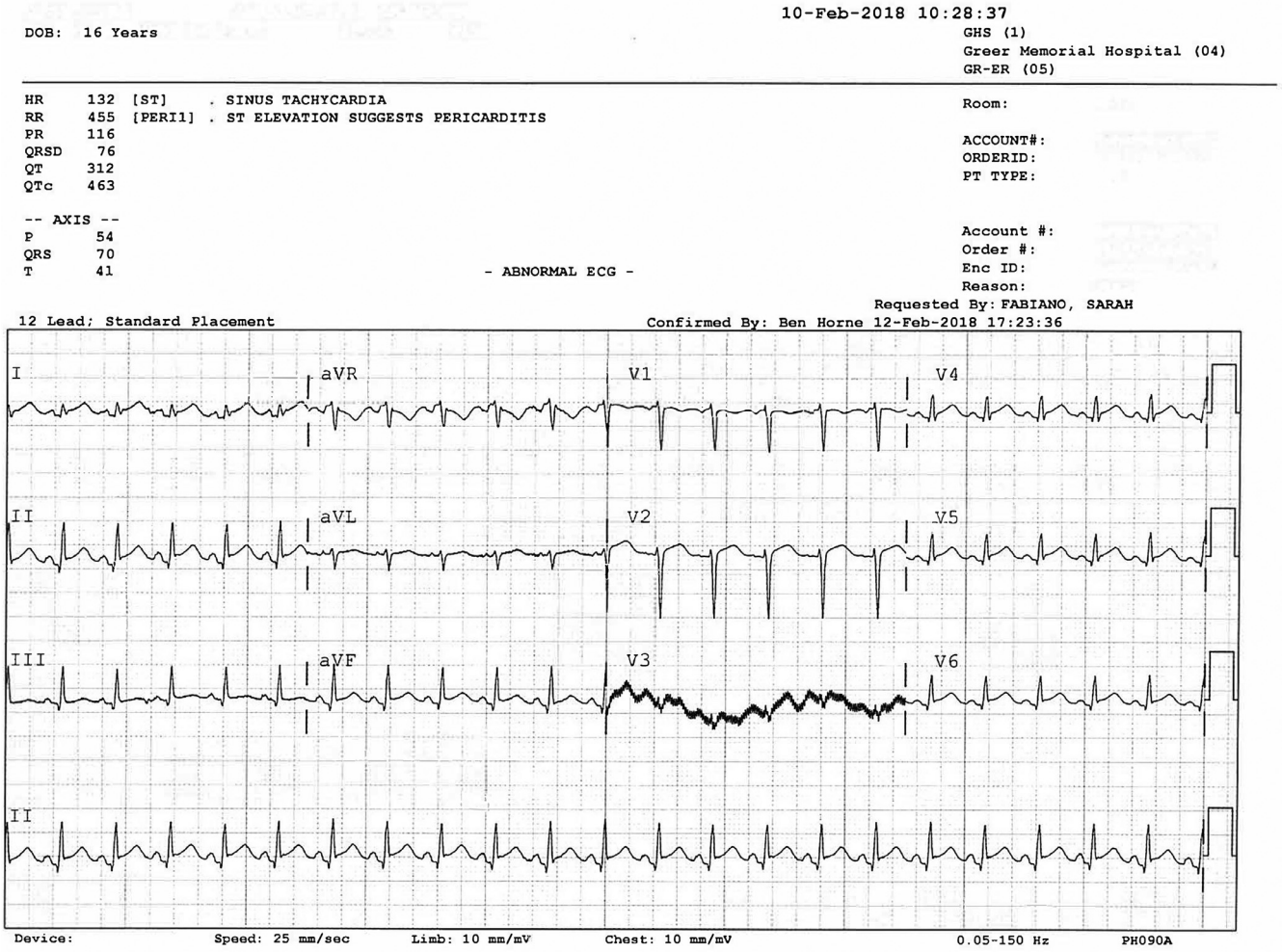

Figure 1.

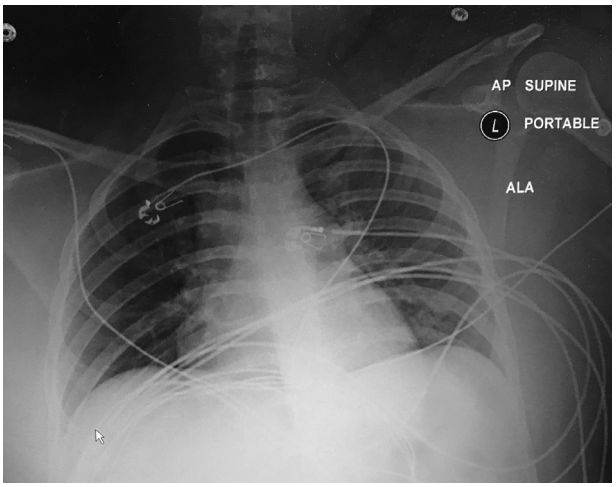

Figure 2. Chest x-ray in Emergency Room.

Given that there were so many pumps, tubes, and lines, each move was calculated and was a team effort (Fig. 5). During the flight, the paramedic took over managing the ventilator and the sedation, the nurse managed the medication drips, and the perfusionist managed the ECMO machine (Fig. 6). The total flight time was 44 minutes. It was without issue, and the patient tolerated the flight well.

After arrival at the new facility, the patient was switched to the new ECMO machine; the total time for the switch was under 1 minute. The patient was kept on ECMO, and the family was prepped for impending heart transplant. The patient then began to recover on her own. She had kidney failure and was placed on dialysis. She continued to improve, had a tracheostomy placed,

Figure 3.

Figure 4.

Figure 5.

and eventually started making urine. She was decannulated on March 8, 2018. She continued to recover and was transferred to a rehabilitation center on April 26, 2018; she was discharged home on May 4, 2018. She has little memory of the critical aspects of the case but does recall the visit to the emergency room and maybe being in an airplane.

Discussion

Influenza is a disease that can range from mild to severe illness, including the feared myocarditis. Myocarditis is caused by many viruses. The virus itself replicates in the heart, causing interstitial edema and necrosis. It is estimated that the incidence of myocarditis can be as high as 10%. Because pulmonary

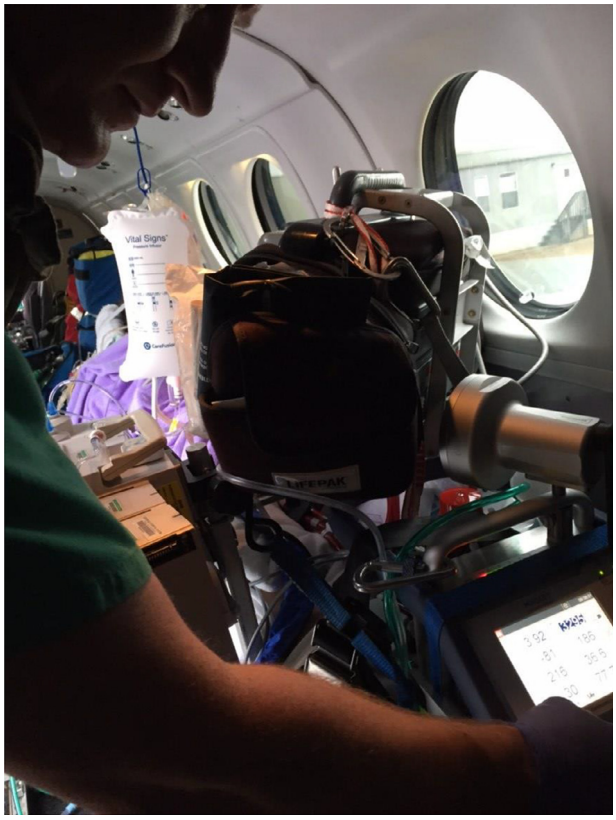

Figure 6.

Figure 7.

complaints are more common and quite severe in influenza, it is thought to complicate the diagnosis of myocarditis. Usually, the symptoms begin between days 4 and 7 after the onset of illness. The patient may present with worsening shortness of breath, chest pain, and/or palpitations. On physical examination, the patient will usually have sinus tachycardia that is higher than can be explained by fever and possibly signs of cardiomegaly and congestive heart failure. Recognizing and treating this complication early are important.

The 2017 influenza epidemic was mainly caused by influenza A H3N2. The vaccination was estimated to be 40% effective. The CDC and other health care professionals encourage everyone to be vaccinated because it also protects against influenza B, which emerges in the spring. The flu vaccination has been shown to reduce the risk of flu in children. Our patient had not been vaccinated.

The role of fixed wing and critical care transport was key in our case. We were able to transfer our patient quickly and with ease. It was important to be able to take the specialists, including the perfusionist, and have an organized team approach that was dedicated to this patient. It is also important to recognize the critical care ground crew who not only assisted in transferring the patient from the first hospital but also helped facilitate her transfer to the airplane. It has also been noted that this case was the first in South Carolina history

of a pediatric patient who was flown and was already cannulated on ECMO.

Today, our patient has fully recovered and is back in high school. Her only deficit is some right foot drop, which they suspect will recover fully, and she has a normal gait with a brace. Her last electrocardiogram was completed on May 10, 2018, and it was completely normal. We have stayed in touch with her family throughout the entire process and recently were reunited with the emergency room team and the nurse who was on the fixed wing aircraft. With her permission, I have attached a photograph (Fig. 7).

Supplementary materials

Supplementary material associated with this article can be found in the online version at https://doi.org/10.1016/j.amj.2019. 02.003.