Science Letters ISSN 2345-5463 – An International Triannually Journal

Case Report
2017 | Volume 5 | Issue 3 | Pages 247-251

ARTICLE INFO

Received
August 15, 2017
Accepted
October 14, 2017
Published
December 25, 2017

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Keywords
CT angiography
Aberrant right subclavian artery
Incidental finding

How to Cite
Asfia BP, Chen XQ, Zhou GP. Asymptomatic aberrant right subclavian artery in a five year old girl: an incidental finding. Sci Lett 2017; 5(3):247-251

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Asymptomatic Aberrant Right Subclavian Artery in a Five Year Old Girl: An Incidental Finding

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Abstract

An aberrant right subclavian artery may, on one hand, remain asymptomatic, causing no harm to the patient; on the other hand, it may lead to symptoms like dysphagia (difficulty in swallowing), recurrent respiratory tract infections, hoarseness of voice, or stridor. An asymptomatic aberrant subclavian artery could be left without any particular treatment, but any symptomatic case should be attended immediately in order to prevent the condition from progressing in severity. A case of a five year old female child with complaints of cough with expectoration and fever was diagnosed to have bronchopneumonia. The patient was admitted and treated with intravenous antibiotics. The chest x-ray showed a small and median heart with the apex not clearly visualized. For further evaluation, an echocardiography and a computerized tomography of the chest was performed, which showed the presence of an aberrant right subclavian artery and a thinner right bronchial lumen. The patient did not have symptoms specific for the aberrant right subclavian artery like dysphagia, stridor, hoarseness of voice, apnea or cyanosis. The patient was continued with the treatment for bronchopneumonia, which was resolved. As the patient was asymptomatic, she was discharged and was advised to follow up in case any symptoms appear.

Introduction

An aberrant subclavian artery is an anatomical variation of the right or left subclavian artery. It is also known as Lusoria artery [1]. The right subclavian artery essentially arises from the brachiocephalic artery, but in about 0.4-1.8% of individuals, it may arise directly from the arch of aorta distal to the left subclavian artery [2]. An aberrant right subclavian artery, on its course to the right arm, crosses the midline posterior to the trachea and esophagus. An aberrant subclavian artery may cause symptoms of dysphagia or recurrent cough/stridor, depending on its compression of the esophagus or the trachea, respectively [3]. An aberrant subclavian artery is usually an incidental finding, as it is asymptomatic most of the times. It can be diagnosed by a CT or MRI of the chest. A symptomatic aberrant subclavian artery is surgically treated by resection of the artery through left thoracotomy [4]. During surgical procedures around the esophagus, an asymptomatic aberrant subclavian artery should be taken into consideration. Any injury to this artery during a surgical procedure may lead to life-threatening complications to the patient [5]. CT angiography is an investigation by which the aberrant artery can be clearly visualized and based on the condition of the patient; the treatment may be planned [6]. An asymptomatic aberrant artery does not require any treatment but if the aberrant artery causes symptoms, the treatment can be planned. This is a case report of an asymptomatic aberrant right subclavian artery in a five-year-old female child. This case is being reported as it is an incidental finding and asymptomatic in order to contemplate this condition during diagnosis.

Case report

A five-year-old female child came to the outpatient department of pediatrics with complaints of fever since six days and cough since three days. The fever was on and off, cough was associated with sputum production, mild in quantity and white in color. In spite of taking antibiotics and antipyretics, the fever and cough recurred. The patient was admitted for further evaluation and management. The patient did not have shortness of breath, difficulty in feeding, stridor or any other significant symptoms apart from fever and cough. The patient had similar complaints in the past, was diagnosed to have recurrent pneumonia and treated accordingly. In addition, the patient had a normal birth history, immunization up to date and no significant family history. On physical examination, the respiratory, cardiovascular and gastrointestinal symptoms were normal. On auscultation, heart sounds were stronger and louder on the right 4th intercostal space compared to the left and no murmurs were heard. The temperature was varying between 37 to 40 degrees Celsius and blood pressure and respiratory rate were normal. One day after admission, the child began to wheeze and the severity of cough increased. On auscultation of the respiratory system, rales were heard over the bilateral infra-scapular regions.

The routine laboratory investigations were performed. Blood investigations findings showed that lymphocytes, alanine amino transferase (ALT), aspartate amino transferase, lactate dehydrogenase (LDH), serum phosphorus, procalcitonin and C-reactive protein (CRP) levels were increased, while a decrease in the neutrophil count, blood urea level, retinol binding protein (RBP), and mean corpuscular hemoglobin concentration (MCHC) was observed. The abnormalities in these investigative findings could be due to the respiratory tract infection in the patient and do not have a correlation with the aberrant subclavian artery per se. Chest X-ray showed bronchopneumonia and the size of the heart was smaller than normal, while the apex of the heart was not visualized. Based on these findings, the patient was started on treatment for bronchopneumonia with cefodizime and erythromycin intravenously, budesonide suspension along with ipratropium bromide solution for inhalation two times a day and vitals were regularly monitored. With this treatment, the fever and cough subsided, and rales disappeared on auscultation.

Because of the abnormality of the heart shadow on Chest X-ray, it was decided to do an echocardiogram, the results showed a median heart and an aberrant right subclavian artery. Later,

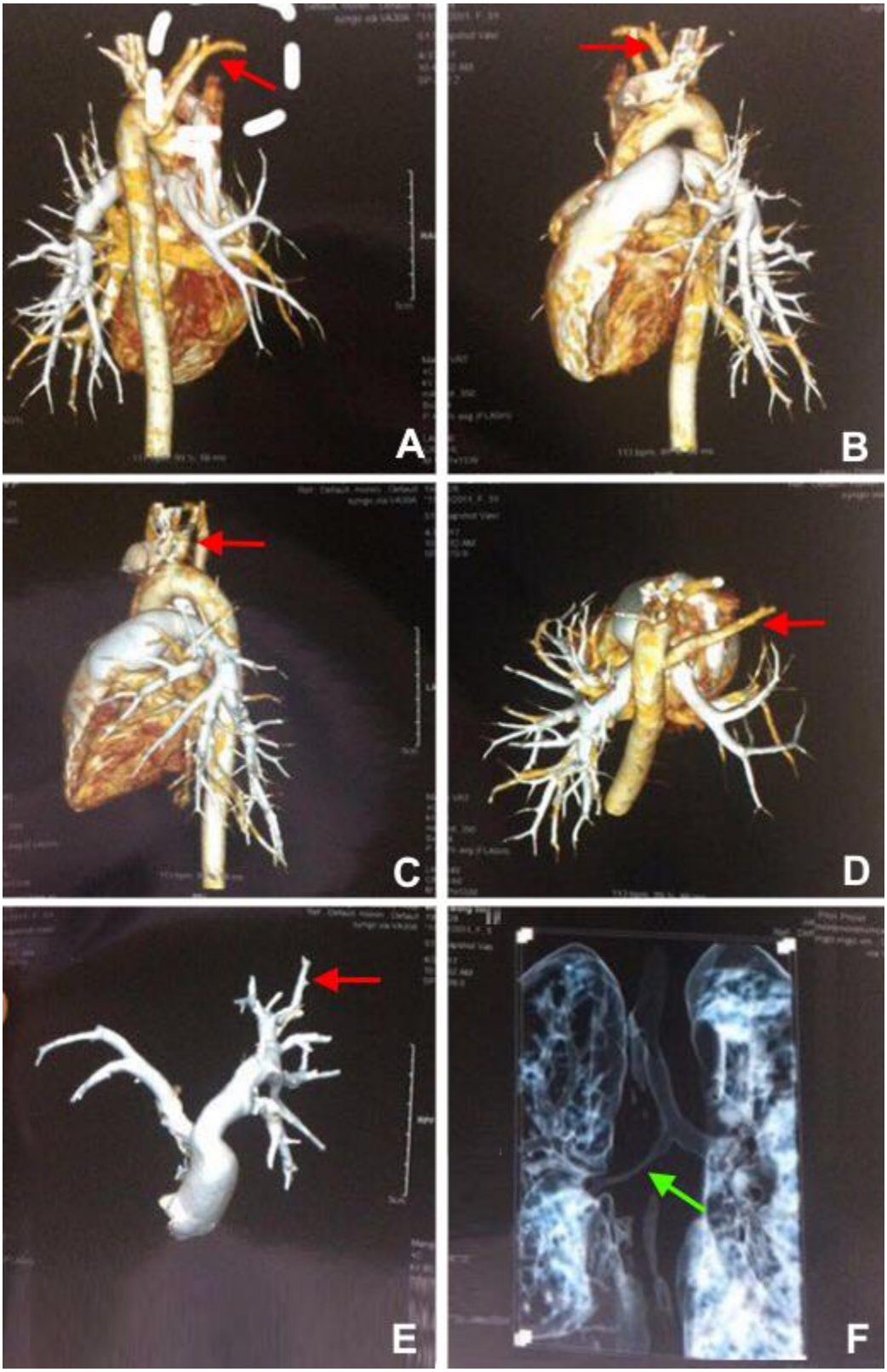

Fig. 1 CT Angiography results of the aberrant right subclavian artery and narrowed right bronchial lumen. **A-E** = Aberrant right subclavian artery (red arrows); **F** = narrowed right bronchial lumen (green arrow).

CT was suggested to be performed. The CT report showed that (1) the upper right lung tissue was not developed (pulmonary artery, pulmonary vein and bronchus), (2) the lumen of the right bronchus was significantly narrow (about 3.3 × 5.0 mm) and (3) an aberrant right subclavian artery.

Discussion

The aberrant subclavian artery is a common congenital anomaly of the arch of the aorta. It is a variation in the anatomy of the right or left subclavian artery [1]. The right subclavian artery normally arises from the innominate artery arising from the arch of aorta [2]. The right subclavian artery is called aberrant when it arises directly from the arch of the aorta. The left subclavian artery is called aberrant when it arises from a different position of the aorta. This results in the formation of the Diverticulum of Kommerell, which is a dilated segment [3]. The aberrant right subclavian artery is usually asymptomatic and does not need treatment. The subclavian arteries course their ways behind the esophagus and the trachea. In this course of the aberrant artery, a vascular ring around the esophagus and trachea may be formed. When these arteries compress the esophagus, the patient presents with dysphagia, and when the trachea is compressed, it can cause a persistent cough or stridor [4]. An aberrant right subclavian artery usually causes no symptoms and is often an incidental finding. When symptomatic, it presents a difficulty in feeding or swallowing, recurrent respiratory tract infections, hoarseness of voice, airway obstruction, stridor, apnea or cyanosis. The aberrant right subclavian artery has been observed in approximately 2% of normal individuals. On the other hand, the reported incidence of aberrant right subclavian artery varies between 25%-37% in cases with Down's syndrome and other chromosomal abnormalities [5].

The CT / MRI helps in the definite diagnosis of the aberrant right subclavian artery. CT of the chest allows not only visualizing a vascular anomaly of the arterial branches, but it also helps to analyze the potential pathology in these vessels [6]. A study was performed to detect the aberrant right subclavian artery *in utero* in fetuses between 16 and 23 weeks of gestation by fetal echocardiography. The results concluded that the aberrant right subclavian artery was commonly found in fetuses with chromosomal abnormalities like Down's syndrome, etc. [7].

In symptomatic cases of the aberrant right subclavian artery, resection of the artery through left thoracotomy is a treatment of choice. Translocation and reimplantation of the artery is not a recommended method. With the recently developing micro-invasive techniques, resection of the aberrant right subclavian artery by video thoracoscopy can be done [8]. This procedure has a very short recovery time, which is an advantage [9]. Cases of symptomatic aberrant right subclavian artery are very rare, thus, a single and definite method of treatment has not been recommended. Different surgical procedures are individually chosen for every case. Supraclavicular resection of the right subclavian artery with its translocation to the right side of the aortic arch is also one of the procedures. The resection of the arterial aneurysm is performed by left thoracotomy. The dissection of an aneurysm has also been applied well to treat this condition [10, 11]. In children with an aberrant right subclavian artery, chest radiographs and oxygen saturation as measured by pulse oximetry are almost always normal. CT scans are often used to make a definitive diagnosis. Though rare, serious complications, such as arterioesophageal and arteriotracheal fistulae, can occur in undiagnosed cases of an aberrant right subclavian artery [12, 13].

An aberrant right subclavian artery is a rare vascular anomaly, which may or may not be symptomatic. It is usually an incidental finding when the patient would have been admitted for a different illness, but on investigations would have been diagnosed to have an aberrant right subclavian artery. In a computerized tomography of the chest, the abnormalities of the vessels can be detected and the pathological vessels can be analyzed. In this case, the patient was a five-year-old female child who was admitted for the treatment of bronchopneumonia and was incidentally found to have an aberrant right subclavian artery. The patient had no symptoms pertaining to the aberrant right subclavian artery and was discharged from the hospital with the advice to

follow up if specific symptoms appear. This case report is an example of an incidental finding of an aberrant right subclavian artery.

Conflict of Interest

The authors have no conflict of interest.

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