

# Kommerell's Diverticulum in an Aberrant Right Subclavian Artery: First Case Reported in a Male of Puerto Rican Descent

Gladys Mayte Nogueiras, MD\*; Rafael Vicens-Rodriguez, MD†; Enrique Silva-Ayala, MD‡; Orlando Lopez de Victoria, MD§; Francisco Diaz-Lozada, MD\*\*

A Kommerell's diverticulum is a rare embryologic defect of the aortic arch. The majority of the patients having this defect present with dysphagia, dyspnea, and syncope, or a combination of any 2 or all 3. For symptomatic cases, surgical correction is always the standard of care. However, it is somewhat controversial what to do about asymptomatic cases. While surgery is almost always recommended, should asymptomatic patients undergo this procedure or not? Is it worth performing thoracic surgery for an anomaly whose nature is not really understood? In this case report, we describe a Kommerell diverticulum discovered incidentally in a 70-year-old asymptomatic male. Surgery was not advisable for this patient; therefore, it was decided to manage him with surveillance. This is the first report in the English-language medical literature of a Kommerell diverticulum in a man of Puerto Rican descent. A thorough discussion of this rare anomaly follows; multimodality images of it are included at the end of this manuscript (see Figures 1–3). [*P R Health Sci J* 2017;36:243-245]

*Key words: Kommerell, Diverticulum, Puerto Rican, Aortic anomaly*

**D**r. Friedrich Kommerell first described Kommerell diverticulum in 1936 while performing a barium swallow examination in a patient with suspected stomach cancer (1). A search of the English-language medical literature reveals there are only 88 of Kommerell's diverticulum have so far been reported. Of these, 71 cases demonstrated the diverticulum in an aberrant left subclavian artery, and 17 cases had it in an aberrant right subclavian artery. The majority of these case reports are of patients presenting with dysphagia, dyspnea, cough, stridor, or aortic dissection. Only 4 are asymptomatic patients. Nonetheless, all the cases were treated surgically.

With the advent of minimally invasive procedures (e.g., thoracic endovascular aortic repair: TEVAR), the post-operative morbidity of this pathology has decreased. For many of the patients, this procedure seems fit and adequate; yet, for some patients surgery is not an option.

In our case, the Kommerell diverticulum was discovered late in life in a patient with multiple comorbidities. He was evaluated and found unfit for surgery. The only medical management possible was to follow him closely with multiple serial imaging scans and clinical examinations.

## Case Report

An asymptomatic 70-year-old man with a medical history of diabetes type 2, hypertension, chronic kidney disease, coronary

artery disease, alcohol abuse, and prostate carcinoma came for a follow-up after having undergone a radical prostatectomy. His surgical history included a right nephrectomy, splenectomy, and partial pancreatectomy. At his physical exam, his vital signs were as follows: BP was 130/70 mmHg; HR was 71/min; RR was 15/min.; and temperature was 36.3°C. The remaining measures were unremarkable.

A chest radiograph ordered to evaluate for lung metastasis revealed cardiomegaly, a sclerotic aortic knob, and a mass-like abnormality of unknown etiology in the right paratracheal region (Fig. 1). Consequently, a chest computed tomography with contrast was ordered, revealing a partially thrombosed Kommerell diverticulum in the aberrant right subclavian artery (Fig. 2). An MRI was ordered to further characterize the diverticulum (Fig. 3). Because of the patient's multiple comorbidities, the cardiothoracic surgeon decided the patient was not a candidate for surgical repair. Instead, he decided to

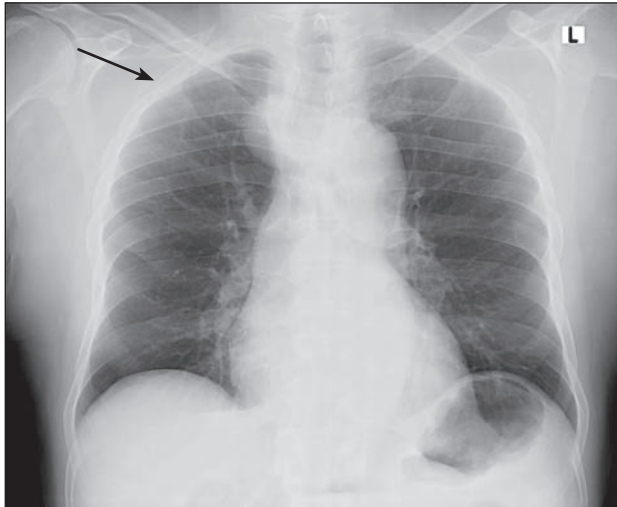
\*Intern, Hospital Auxilio Mutuo, San Juan, Puerto Rico; †Diagnostic Radiologist, Radiology Department-Hospital Auxilio Mutuo, San Juan, Puerto Rico; ‡General Surgeon, Director of Surgery Department, Hospital Auxilio Mutuo, San Juan, Puerto Rico; §Director of Cardiovascular and Thoracic Surgery, Hospital Auxilio Mutuo, San Juan, Puerto Rico; \*\*Director of Rotatory Internship, Hospital Auxilio Mutuo, San Juan, Puerto Rico

*The author/s has/have no conflict/s of interest to disclose.*

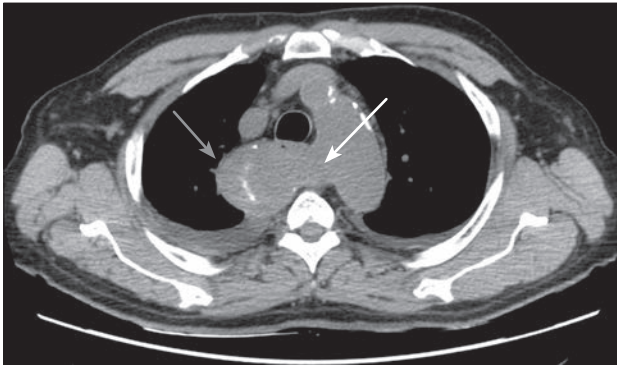
Address correspondence to: Gladys Mayte Nogueiras, MD, 2540 Montclair Ct., Weston, FL 33327. Email: [nogueirasmayte@gmail.com](mailto:nogueirasmayte@gmail.com)

evaluate the patient closely with serial clinical examinations and imaging studies (these last when appropriate).

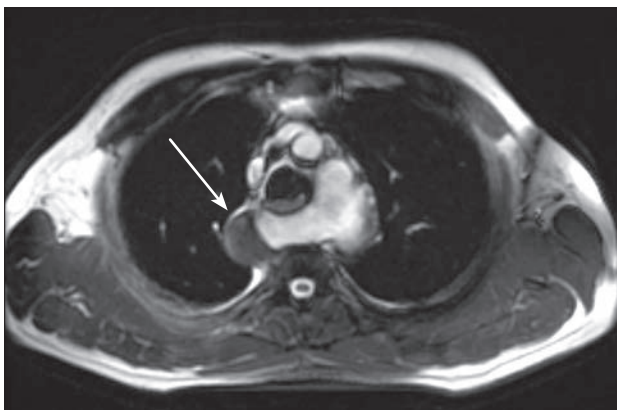
At the time of this publication, 3 years after diagnosis, the patient is alive and is not suffering from any of the complications that often accompany this anomaly, such as rupture or dissection, among others.



**Figure 1.** Frontal radiograph reveals a right paratracheal abnormality with smooth borders (black arrow).



**Figure 2.** Axial chest computed tomography reveals a retroesophageal aberrant right subclavian artery (white arrow) and a Kommerell's diverticulum (gray arrow) with partial thrombosis.



**Figure 3.** Axial T2-weighted FIESTA MRI image confirms partial thrombosis of the Kommerell's diverticulum (white arrow)

## Discussion

Subclavian aberrant aneurysms comprise 0.5% of all aneurysm repairs in the United States (2). A Kommerell diverticulum can be present in different anomalies of the aortic arch; either in a right aortic arch with an aberrant left subclavian artery or a left aortic arch with an aberrant right subclavian artery. There is also an extremely rare left aortic arch with a right descending aorta and a right ductus arteriosus where a Kommerell's diverticulum has been described.

Embryologically, the normal right subclavian artery originates from the right fourth branchial arch. An aberrant right subclavian artery with or without a Kommerell's diverticulum is the most common arch anomaly of the aorta. It is seen in 0.5% of the population (3,4). The Kommerell diverticulum is a remnant of a residual right dorsal arch in isolation or as the origin of the aberrant subclavian artery.

Symptoms present in different ways, according to the location of the diverticulum. If the aberrant subclavian artery is located behind the esophagus (80%), the patient may present with dysphagia to solids or liquids. If it is present between the esophagus and trachea (15%) or anterior to the trachea (5%), the patient may present with dysphagia, dyspnea, or stridor (5).

Since 1892, open surgery via a thoracotomy or via a median sternotomy has been used successfully to treat aortic arch anomalies (6). However, given its high mortality rate, ranging from 8 to 26%, new techniques have emerged to specifically decrease the intra- and postoperative morbidity of such invasive procedures (7). For example, minimally invasive techniques commonly used today include hybrid open-endovascular (8) repair and total thoracic endovascular repair (TEVAR) (9,10). Currently, invasive thoracic surgery is reserved for patients with connective tissue disorders or extensive aortic thoracic disease requiring concomitant open repair.

Recent studies recommend TEVAR as the standard of treatment to repair all symptomatic aberrant subclavian artery pathology (10,13). Accordingly recent case reports on the use of TEVAR to repair symptomatic Kommerell diverticulum have described favorable results (11,12).

Revision of the English-language medical literature reveals only 4 Kommerell diverticula in asymptomatic patients, all of who were treated surgically. With this case report, we showcase the conservative treatment of a patient with asymptomatic Kommerell's diverticulum, as an alternative to surgical repair in patients who are high-risk surgical candidates.

## Resumen

El divertículo de Kommerell es un raro defecto embriológico del arco aórtico. Los síntomas más frecuentes de presentación son disfagia, disnea y síncope. Reportamos el caso de un hombre de 70 años asintomático con un divertículo de Kommerell asociado con una arteria subclavia derecha aberrante con

múltiples imágenes radiológicas. Debido a patologías concomitantes, el paciente fue manejado conservadoramente.

### References

1. Kommerell B. Verlagerung des Ösophagus durch eine abnorm verlaufende Arteria subclavia dextra (Arteria lusoria). *Fortschr Geb Roentgenstrahlen* 1936;54:590–595.
2. Lawrence PF, Gazak C, Bhirangi L, et al. The epidemiology of surgically repaired aneurysms in the United States. *J Vasc Surg*. 1999;30:632–640.
3. Stone WM, Ricotta JJ 2nd, Fowl RJ, Garg N, Bower TC, Money SR. Contemporary management of aberrant right subclavian arteries. *Ann Vasc Surg* 2011;25:508–514
4. Edwards JE. Anomalies of the aortic arch system. *Birth Defects Orig Artic Ser* 1977;13:47–63.
5. Gomes MM, Bernatz PE, Forth RJ. Arteriosclerotic aneurysm of an aberrant subclavian artery. *Dis Chest* 1968;54:549–552.
6. Backer CL, Russell HM, Wurlitzer KC, Rastatter JC, Rigsby CK. Primary resection of Kommerell diverticulum and left subclavian artery transfer. *Ann Thorac Surg* 2012;94:1612–1617.
7. Vierhout BP, Zeebregts CJ, van den Dungen JJ, Reijnen MM. Changing profiles of diagnostic and treatment options in subclavian artery aneurysms. *Eur J Vasc Endovasc Surg* 2010;40:27–34.
8. Kawajiri H, Shimizu H, Yoshitake A, Yozu R. Hybrid repair of a Kommerell diverticulum associated with a right aortic arch and a left descending aorta. *J Vasc Surg* 2012;56:1727–1730.
9. Silveira PG, Franklin RN, Cunha JR, Neves TT, Nascimento GG, Bortoluzzi CT. Total endovascular repair of aberrant left subclavian artery with Kommerell's diverticulum using a customized branched device. *J Vasc Surg* 2013;57:1123–1125.
10. Andersen ND, Barfield ME, Hanna JM, et al. Intrathoracic subclavian artery aneurysm repair in the thoracic endovascular aortic repair era. *J Vasc Surg* 2013;57:915–925.
11. Cinà CS, Althani H, Pasenau J, Abouzhar L. Kommerell's diverticulum and right-sided aortic arch: a cohort study and review of the literature. *J Vasc Surg* 2004;39:131–139.
12. Austin EH, Wolfe WG. Aneurysm of aberrant subclavian artery with a review of the literature. *J Vasc Surg* 1985;2:571–577.
13. Kim KM, Cambria RP, Isselbacher EM, et al. Contemporary surgical approaches and outcomes in adults with Kommerell diverticulum. *Ann Thorac Surg* 2014;98:1347–1354.