A 50-year-old right-handed man (ex-smoker) with a history of left upper limb claudication for the previous 6 years underwent successful left subclavian artery (LSA) angioplasty with stent implantation (8×59 Genesis Stent [Cordis, Warren, NJ]) for 99% ostial and proximal stenosis of the LSA with use of a combined anterograde and retrograde approach (Figure 1A through 1D). The erythrocyte sedimentation rate and the C-reactive protein were normal. No other vascular system was affected. After an asymptomatic period of 4 months, the patient presented with a history of high-grade fever for 7 days, pain and swelling of the left hand, bluish discoloration of finger tips and palms, and restriction of movements of the fingers of left hand (Figure 2A). All left upper limb pulses were well felt. A Doppler arterial study of the left upper limb was also normal. At the diagnostic angiogram, fluoroscopy revealed that the LSA stent had transected at multiple levels (4 levels) (Figure 3A and Movie I of the online-only Data Supplement). The angiogram revealed the presence of 2 pseudoaneurysms, one at the origin of the LSA and another within the distal portion of the stent (Figure 3B and Movie II of the online-only Data Supplement). Flow within the stent and in the distal portion of the LSA and the brachial artery was normal. The stent fracture at multiple levels had led to pseudoaneurysm formation, throm-
basis, and microembolization, thereby explaining the symp-
toms of the left hand. Three blood cultures taken from the left
upper limb were reported as sterile. A 64-slice contrast-
enhanced computed tomography of the chest ruled out stent
compression by the thoracic structures (Figure 4A through
4D). It also revealed that there were 2 pseudoaneurysms (not
1, as earlier thought) at the origin of the LSA (Figure 4D). A
8\times59 ADVANTA V12 covered stent (Atrium Medical Corp,
Hudson, NH) was deployed across the previous LSA stent to
cover the stent fractures and exclude the proximal and distal
pseudoaneurysms. A repeat angiogram revealed that the distal
pseudoaneurysm was successfully excluded, but flow in the
proximal pseudoaneurysms was still present (Figure 5A).
Flaring of the proximal end of the stent graft with a 9\times10
ATB balloon at 12 atm to achieve a more optimal apposition
did not exclude the flow. Finally, using a 6F right Judkins
diagnostic catheter, 3 coils (two 0.038\times8\times8 Cook Emboli-
zation coils and one 0.038\times5\times4 Cook detachable coil; Cook
Medical, Bloomington, IN) were deployed in the more
anterior of the 2 proximal pseudoaneurysms, and 1 coil was
deployed in the more posterior one (0.038\times8\times8 Cook
Embolization coil) (Figure 5C and 5D), achieving complete
occlusion. The pain, swelling, and discoloration improved
dramatically (Figure 2B). Following a 2-week antibiotic
course, the patient was discharged on dual antiplatelet (aspi-
rin and clopidogrel) therapy. A check angiogram after 6
weeks (Movie III of the online-only Data Supplement) and a
computed tomography angiogram after 12 weeks (Figure 6)
confirmed stent-graft patency without evidence of fracture or
pseudoaneurysm formation. At 9 months follow-up, the
patient remains asymptomatic, and has regained full power in
his left hand.

Subclavian artery angioplasty with or without stenting is a
well accepted, less invasive alternative to surgical revascu-
larization for symptomatic proximal subclavian artery steno-
sis.\textsuperscript{1} Reports of stent fracture involving the brachiocephalic

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure3.png}
\caption{A, Fluoroscopy of LSA stent revealing complete transaction of the stent at 4 different places. B, Angiogram of LSA revealing pseudoaneurysms in the proximal and distal portion of the stent. LSA indicates left subclavian artery.}
\end{figure}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure4.png}
\caption{Sixty-four slice contrast-enhanced computed tomography. A, Multiplanar reformatted image confirming stent fracture (transaction) at 4 levels. B, Multiplanar reformatted image ruling out stent compression by thoracic outlet structures. C and D, Three-dimensional volume rendered computed tomography images demonstrating the presence of 2 proximal pseudoaneurysms and 1 distal aneurysm.}
\end{figure}
vessels are rare, because this is a relatively immobile region; thereby, it is protected against the biomechanical stress related to arm movements.\textsuperscript{2–4} Stent fracture (transection) at multiple levels in the proximal subclavian artery has not been previously reported. Our patient specifically denied any history of trauma or hyperextension injury. The length of the stented segment is a well known risk factor for stent fracture. Another factor could be the continuous mechanical stress within the pulsatile subclavian artery, leading to metal fatigue and stent fracture. A third factor that needs to be considered is the stent design. Periard et al\textsuperscript{2} reported a similar case of stent transaction within the right brachiocephalic trunk. They postulated that the stainless steel stent could have had mechanical properties that may explain the stent fracture.

**Disclosures**

None.

**References**


Multiple Fractures With Pseudoaneurysm Formation in a Subclavian Artery Stent
Ravi S. Math, Ravindranath Khandenahally Shankarappa, Ramesh Dwarakaprasad, Satish Karur, Shivakumar Bhairappa, Praveen Jayan J.P. and Cholenahally Nanjappa Manjunath

_Circulation_. 2011;123:e602-e604
doi: 10.1161/CIRCULATIONAHA.110.015834
_Circulation_ is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2011 American Heart Association, Inc. All rights reserved.
Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circ.ahajournals.org/content/123/20/e602

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in _Circulation_ can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to _Circulation_ is online at:
http://circ.ahajournals.org//subscriptions/