

# Knotted Catheter in the Brachial Artery: When to Perform Surgery?

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## ABSTRACT:

Knotted catheter in the brachial artery: when to perform surgery?

**Objective:** Catheter knotting is a rare complication of coronary angiography. Treatment is controversial and differs from one laboratory to another.

**Case:** A 79 year-old patient was taken to the catheterization laboratory for diagnostic coronary angiography. Right coronary artery couldn't be cannulated with 5-F JR4 diagnostic catheter due to severe subclavian artery tortuosity. After several clockwise and counterclockwise maneuvers, a catheter knot was formed in the brachial artery region. Due to multiple unsuccessful attempts for retrieval, the patient experienced severe forearm pain which led to discontinuation our maneuvers. Therefore, we decided to perform surgery for removal of the catheter. We pulled the catheter slowly until the knot reached the tip of the sheath. The knot being in the radial artery, a surgical arteriotomy was performed safely under local anesthesia.

**Conclusion:** When all efforts fail, surgery can still be performed safely. In that situation, pulling the knot back into the radial artery should be tried vigorously

**Keywords:** Catheter knot, complication, transradial angiography

## ÖZET:

Brakiyal arterde kateter düğümlemesi: Ne zaman cerrahiye verelim?

**Amaç:** Kateter düğümlemesi koroner anjiyografinin nadir bir komplikasyonudur. Tedavi tartışmalı olup bir laboratuvaradan diğerine farklılık göstermektedir.

**Olgu:** Yetmiş dokuz yaşında bir hasta diagnostik koroner anjiyografi için kateter laboratuvarına alındı. Subklavian arter ileri derecede kıvrımlı olduğu için sağ koroner arter 5-F JR4 diyagnostik kateter ile kanüle edilemedi. Saat yönünde ve tam tersi istikamette yapılan birçok manevradan sonra brakiyal arter hizasında kateterde düğüm oluştu. Kateteri çıkarmak için yapılan çok sayıda başarısız girişime bağlı olarak hastada ciddi ön kol ağrısı gelişti ve manevraları kesmek zorunda kaldık. Bunun üzerine kateteri cerrahi olarak çıkarmaya karar verdik. Düğüm yapan yer kılıfın ucuna gelecek şekilde kateteri yavaşça geri çektik. Düğüm radial arter hizasında iken lokal anestezi altında arteriotomi yapılarak kateter rahatça çıkarıldı.

**Sonuç:** Hiçbir girişim işe yaramadığında, cerrahi müdahale hala güvenli bir şekilde yapılabilir. Bu durumda ise düğümün radial artere geri çekilmesi için yoğun çaba sarf edilmelidir.

**Anahtar kelimeler:** Kateter düğümlemesi, komplikasyon, transradial anjiyografi

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## INTRODUCTION

As transradial coronary angiography (RCA) gains popularity due to its safety and cost effectiveness, it still has its unique complications such as radial artery occlusion, spasm and so on (1). Among these, catheter kinking or knotting is a recognized, but not

fully addressed complication and its management differs from one laboratory to another. Herein we present a case of coronary catheter knotting and entrapment in the brachial artery. After multiple unsuccessful attempts to unravel the knot, the patient was operated for surgical removal of the catheter.

### CASE

A 79 year-old patient was introduced to the catheterization laboratory for diagnostic coronary angiography due to positive stress test. A 6-F 12 cm radial sheath (Terumo, Japan) was inserted into the radial artery. Left coronary system was engaged with 5-F JL 3.5 (Cordis Europa, Roden Holland) diagnostic catheter. However, right coronary artery couldn't be cannulated with 5-F JR4 diagnostic catheter due to severe subclavian artery tortuosity. After several clockwise and counterclockwise maneuvers, there was damping in the pressure trace and difficulty in contrast injection. Fluoroscopic examination along the course of the catheter revealed a tight knot in the brachial artery region. First, we tried to unravel the knot by making counterclockwise rotations and applying gentle pull on the catheter. Then we tried to pass 0.035 inch hydrophilic guidewire through the knot to straighten and open the lumen but once again we failed. After multiple unsuccessful attempts, the patient experienced severe forearm pain which limited our maneuvers. We then pulled the catheter slowly until the knot came into the radial artery and decided to perform surgery for removal of the catheter (Figure-1,2). The entrapped catheter was successfully removed through one centimeter vertical arteriotomy including puncture site under local anesthesia. Coronary angiography was performed via the femoral approach on the other day and the patient was discharged uneventfully.

### DISCUSSION

Although catheter knotting is a known complication of coronary angiography, there is not much data regarding its management particularly for radial route (2). It is usually the result of excessive torquing of the RCA catheter especially in the setting of a tortuous brachiocephalic artery. Sometimes simple counterclockwise rotation and gentle traction may be adequate, and at many times, the problem may even go unnoticed. When these simple maneuvers are not enough, a 0.035 guidewire may be inserted into the catheter. If the knot is loose enough wire passage may be achieved and again the

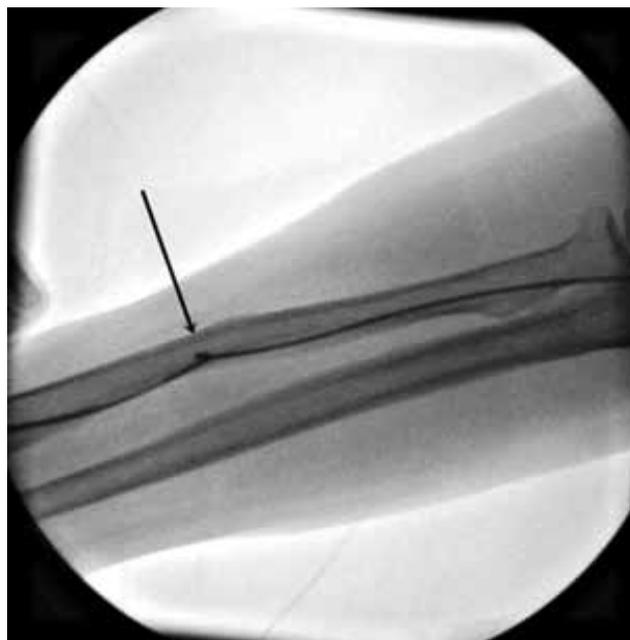


Figure-1: Catheter knot seen in the mid part of radial artery (black arrow)



Figure-2: Catheter knot seen just at the tip of the sheath (white arrow)

forementioned maneuvers can be tried.

When a more complex intervention becomes necessary, the tricky part is to be able to stabilize the distal end of the catheter beyond the knot. For instance Tanner et al. (2) used a W grabber device to

hold the distal part. Once you grab the distal part of the catheter, the operator can simply untwist the catheter by rotation along with traction. Zhang et al. (3) used Goose Neck Snare (Microvena, St. Paul, MN) with the same intention of making the distal part still. Among these, the most recent technique belongs to Patel et al. (4). They used a simple sphygmomanometer cuff to squeeze the forearm. This method stabilized the catheter past the knot and they applied the counterclockwise rotation and traction with successful retrieval of the catheter. Changing the sheath with a bigger size such as 8-F long sheath has been reported in the literature (5). This swallowing technique may be feasible for femoral route, however since radial artery cannot accommodate such big catheters, it seems problematic for radial artery. On the other hand,

Waked et al. (6) used this swallowing technique in a different way. They exchanged 6-F radial sheath with a 5-F long radial sheath. Under fluoroscopic guidance they managed to bring the tip of the long sheath to the antecubital fossa where the knot was located. At this point simple pulling of the catheter unraveled the knot, making it slip into the sheath.

In our case we did not have the necessary equipment to stabilize the catheter such as a snare or W grabber device. Unfortunately we were unaware of Tejas Patel's simple technique (4). Because of that, we decided to perform surgery. Our chance to pull the knot back into the radial artery made the surgical intervention easier. Pulling the knot to the distal part of the radial sheath and then making a surgical decision seems to be a safe approach when all interventional maneuvers fail.

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