

**Kaynaklar**

1. Dearani JA, Danielson GK. Congenital Heart Surgery Nomenclature and Database Project: Ebstein's anomaly and tricuspid valve disease. *Ann Thorac Surg* 2000; 69 (4 Suppl): S106-17.
2. Attenhofer Jost CH, Connolly HM, Edwards WD, Hayes D, Warnes CA, Danielson GK. Ebstein's anomaly-review of a multifaceted congenital cardiac condition. *Swiss Med Wkly* 2005; 135: 269-81.
3. Anderson KR, Zuberbuhler JR, Anderson RH, Becker AE, Lie JT. Morphologic spectrum of Ebstein's anomaly of the heart: a review. *Mayo Clin Proc* 1979; 54: 174-80.
4. Lev M, Liberthson RR, Joseph RH, Seten CE, Eckner FA, Kunske RD, et al. The pathologic anatomy of Ebstein's disease. *Arch Pathol* 1970; 90: 334-43.
5. Zuberbuhler JR, Allwork SP, Anderson RH. The spectrum of Ebstein's anomaly of the tricuspid valve. *J Thorac Cardiovasc Surg* 1979; 77: 202-11.
6. Gerbode F, Hultgren H, Melrose D, Osborn J. Syndrome of left ventricular-right atrial shunt; successful surgical repair of defect in five cases, with observation of bradycardia on closure. *Ann Surg* 1958; 148: 433-46.
7. Riemenschneider TA, Moss AJ. Postperfusion syndrome. Report of four cases and review of the literature. *J Pediatr* 1966; 69: 546-52.
8. Wasserman SM, Fann JI, Atwood JE, Burdon TA, Fadel BM. Acquired left ventricular-right atrial communication: Gerbode-type defect. *Echocardiography* 2002; 19: 67-72.
9. Kastor JA, Goldreyer BN, Josephson ME, Perloff JK, Scharf DL, Manchester JH, et al. Electrophysiologic characteristics of Ebstein's anomaly of the tricuspid valve. *Circulation* 1975; 52: 987-95.
10. Frescura C, Angelini A, Daliento L, Thiene G. Morphological aspects of Ebstein's anomaly in adults. *Thorac Cardiovasc Surg* 2000; 48: 203-8.

## Resistant radial artery spasm during coronary angiography via radial approach responded to local warm compress

### *Radiyal arter yoluyla yapılan koroner anjiyografi sırasında gelişen ve lokal ılık kompres ile çözülen dirençli radiyal arter spazmı*

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**Introduction**

The radial artery approach for coronary angiography and angioplasty has been shown to be a safe alternative to the femoral approach (1). Although this technique is increasingly preferred, radial artery spasm (RAS), a potential complication, limits its widespread use. RAS may be resistant to vasodilator medications, which are usually useful in this situation, and may cause serious complications (2). We present a case with RAS, which was resistant to vasodilators and lidocaine, but responded well to a warm compress applied along the arm and the forearm.

**Case report**

A 62-year-old man was referred to our cardiac catheterization laboratory for his exertional chest pain. Because both femoral arteries were pulseless we decided to perform angiography via radial artery after confirming that the Allen test was positive. The right arm was placed in an abducted position with slight wrist overextension. Local skin anesthesia was obtained by 1% lidocaine. Following a small incision radial artery was punctured with a 20 G short venous angiocatheter. Before insertion of the guidewire, 3000 U unfractionated heparin, 5 mg verapamil and 100 microgram nitroglycerin were given consecutively via venous sheath. The artery was cannulated with a 45 cm 0.025" non-teflonized wire followed by an insertion of 5F 15 cm

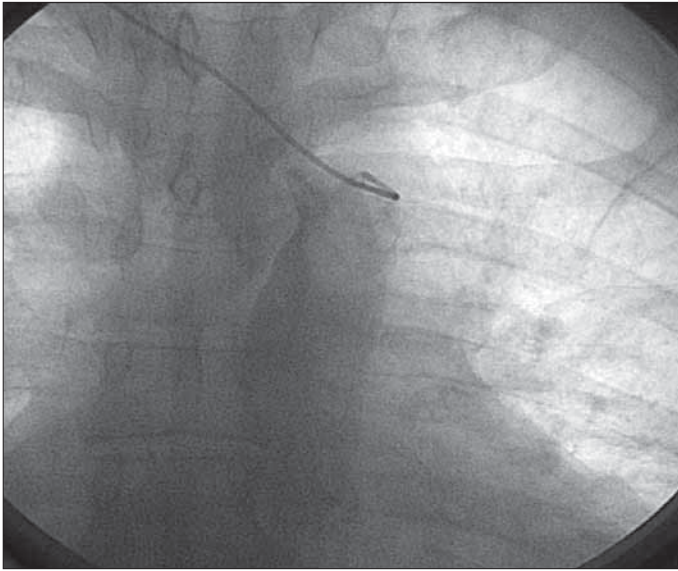
radial sheath without resistance. A diagnostic 5F catheter was then inserted with a 0.035" J wire easily and advanced up to the aortic arch. During manipulation of the diagnostic catheter in order to fall into ascending aorta severe painful spasm in the radial artery occurred. Neither the catheter nor the sheath could be retrieved and these attempts were severely painful. Verapamil of 5 mg (twice) and nitroglycerin of 100 microgram (3 times) were given via diagnostic catheter trapped in aortic arch (Fig. 1). Then nitroglycerine infusion via left brachial vein was started. At the end of all these medications the spasm was not resolved, arterial blood pressure was 95/60 mmHg and pulse rate was 48 beats/minute. Then, we decided to apply warm compress along the right radial and brachial arteries. We covered the antecubital face of the forearm and the arm with surgical gauzes soaked into warm water of nearly 50°C (Fig. 2). Approximately, after 3 minutes the patient reported that the pain was completely resolved. We then retrieved the catheter and the radial sheath easily. Both the radial and the ulnar artery were palpable. The procedure was stopped according to the patient's preference. The patient was discharged at the end of 2 hours. The post-procedural period was uneventful.

**Discussion**

The radial artery approach for coronary procedures has been shown to be a safe alternative to the femoral approach (1). Although

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**Figure 1. Diagnostic left Judkins catheter of 5F entrapped with its tip in the aortic arch because of radial artery spasm**



**Figure 2. Right forearm and the arm are covered with multiple surgical gauzes sinked in warm water of nearly 50°C. Radial sheath could be pulled back easily with a part of it in the radial artery**

this technique is increasingly preferred due to fewer vascular complications, immediate ambulation and improved patient comfort, radial artery spasm, a potential complication, limits its widespread use (2). Several vasodilators, alone or in combination, have been shown to reduce the incidence and severity of RAS (3, 4). However, even after the

use of a vasodilator, RAS has been reported in up to 20% of the patients (3). Studies focus mainly on the prevention of RAS rather than the management when it occurs, but variety of vasodilators is also used in this situation. On the other hand, hypotension and bradycardia may limit the use of these medications as in the present case. Spasm may be resistant to these medications and cause serious complications such as eversion endarterectomy (2). In clinical practice, resistant RAS may necessitate general anesthesia in order to relieve the painful arterial spasm. As a result, novel drugs and methods are needed in the management of RAS. In the present case RAS responded well to the application of warm compress along the brachial and radial artery. Warm environment has been shown to cause vasodilation and decrease in vascular resistance (5). Although the exact mechanism is not well known, nitric oxide release may play a role, at least in part, in this phenomenon (6). In practice, the ideal temperature as well as the duration in the application of warm compress is not known. Christensen et al. (6) obtained maximal vasodilation with application of local heating on the forearm at 41°C compared to 37°C and 39°C. In our case, surgical gauzes sinked into warm water of nearly 50°C were used and it took nearly 3 minutes to relieve the RAS.

## Conclusion

In conclusion, local warm compress may be a simple solution in the management of resistant RAS in daily clinical practice. Additional controlled studies are needed to test the outcome and the applicability of this method.

## References

1. Louvard Y, Lefèvre T, Allain A, Morice MC. Coronary angiography through the radial or the femoral approach: the CARAFE Study. *Catheter Cardiovasc Interv* 2001; 52: 181-7.
2. Dieter RS, Akef A, Wolff M. Eversion endarterectomy complicating radial artery access for left heart catheterization. *Catheter Cardiovasc Interv* 2003; 58: 478-80.
3. Kim SH, Kim EJ, Cheon WS, Kim MK, Park WJ, Cho GY, et al. Comparative study of nicorandil and a spasmolytic cocktail in preventing radial artery spasm during transradial coronary angiography. *Int J Cardiol* 2007; 120: 325-30.
4. Kiemeneij F, Vajifdar BU, Eccleshall SC, Laarman G, Slagboom T, van der Wieken R. Evaluation of a spasmolytic cocktail to prevent radial artery spasm during coronary procedures. *Catheter Cardiovasc Interv* 2003; 58: 281-4.
5. Tei C, Horikiri Y, Park JC, Jeong JW, Chang KS, Toyama Y, et al. Acute hemodynamic improvement by thermal vasodilation in congestive heart failure. *Circulation* 1995; 91: 2582-90.
6. Christen S, Delachaux A, Dischl B, Golay S, Liaudet L, Feihl F, et al. Dose-dependent vasodilatory effects of acetylcholine and local warming on skin microcirculation. *J Cardiovasc Pharmacol* 2004; 44: 659-64.