

# Aortic Intimo-Intimal Intussusception: An Infrequent Complication of Aortic Dissection Case report and review of the literature

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## AORTİK İNTİMO-İNTİMAL İNTÜSSÜSEPSİYON: AORT DİSEKSİYONU- NUN NADİR BİR KOMPLİKASYONU

### *Olgu sunumu ve literatür taraması*

*Akut aortik disseksiyonun nadir bir komplikasyonu olan İntimo-intimal intussüepsiyon intimanın dairesel olarak yırtılması sonucu kendi üstüne kıvrılması ile karakterizedir. Tam yöntemleri kesin tanının konmasında yetersiz kalabilmektedir. Bu yazımızda böyle bir olgunun sunumuyla birlikte literatür taraması yapılmıştır. Ciddi aort yetmezliği ile birlikte nörolojik bulguların eşlik ettiği aort disseksiyonu olgularında intimo-intimal intussüepsiyon akla getirilmelidir.*

**Anahtar kelimeler:** aort disseksiyonu, intussüepsiyon, transözofajiyal ekokardiyografi, aortografi

Intimo-intimal intussusception is an infrequent manifestation of acute aortic dissection in which the intimal tear occurs circumferentially with intussusception of the ascending aortic intima downstream. To the best of our knowledge, only 15 cases of intimo-intimal intussusception have been reported up to date (1-13). We report such a case with De Bakey type I dissection, and also present a review of the pertinent literature.

### Report of Case

A 47-year-old man was referred to the emergency room of another institution with a one-hour history of retrosternal chest pain and confusion followed by a syncopal episode. The patient had a 10-year history of hypertension which had been treated with medications. On initial evaluation, there were decreased upper extremity and carotid pulses but intact femoral and dorsalis pedis pulses bilaterally. Upper and lower extremity blood pressure were 70/30 mm Hg, and 160/60 mm Hg, respectively. Cardiac examination

revealed a grade 3/4 diastolic murmur over the left sternal border. ECG showed normal sinus rhythm with no ischemic changes. Chest radiography revealed an enlarged cardiac silhouette and mediastinal widening. Transthoracic echocardiography showed moderate dilatation of the aortic root and confirmed the moderate aortic regurgitation. Computed tomographic (CT) scanning with intravenous contrast medium confirmed the moderate ectasia of the ascending aorta and detected an intimal flap in descending aorta (Fig. 1).

At angiography, a filling defect at the level of the aortic arch with partial obstruction of the arch vessels (Fig. 2) was seen. Coronary angiography was unsuccessful, as true lumen could not be entered during catheterization.

The patient was then transferred to our department, and emergency surgery was undertaken. A median sternotomy was performed while the right femoral artery was cannulated.

Cardiopulmonary by-pass was initiated with systemic hypothermia to 18 °C. The ascending aorta was opened in a longitudinal manner under total circulatory arrest and retrograde cerebral perfusion via superior vena cava with a flow of approximately 300 ml/min and with an attempt to keep jugular venous pressure below 20 mmHg. Antegrade - retrograde blood cardioplegia as described elsewhere (14), was used for myocardial management. A circumferential tear of the intima beginning 0.5 cm distal to the left coronary ostium was detected. All leaflets of the aortic valve

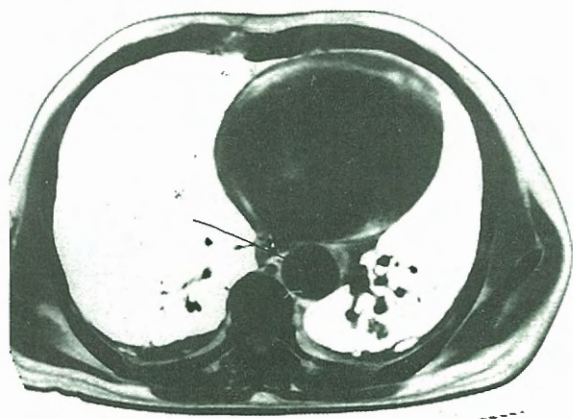


Figure 1. Preoperative computed tomography showing the intimal flap (arrowhead) in descending aorta.

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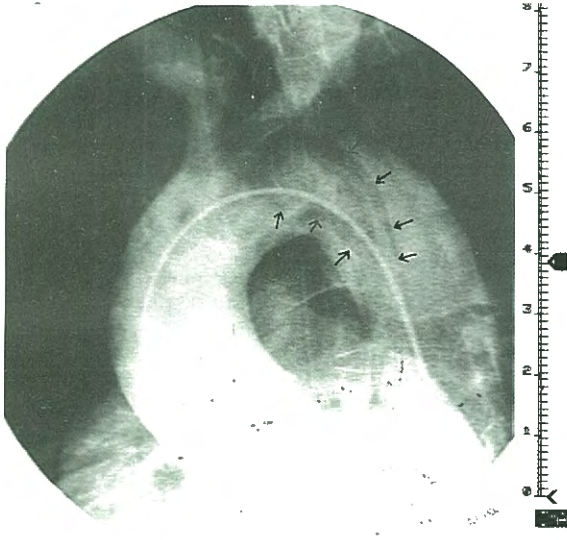


Figure 2. Preoperative aortography showing the intimal intussusception (arrowheads).

were detached from their commissures and prolapsed. The intima was found to be completely detached and intussuscepted into the descending aorta, obstructing the arch vessels. The intima was pulled back from the descending aorta. The arch vessels were found to be fully patent. The dissecting aorta was transected circumferentially at point 2 cm proximal to the origin of innominate artery, and sandwiched between Teflon felts. A 30-mm, woven, double velour Dacron graft prosthesis (Hemoshield, Meadox Medical, Inc., Oakland, New Jersey, USA) was then anastomosed to this point. Cardiopulmonary by-pass was reinstated, the air was evacuated from the arch vessels and the graft was crossclamped. Systemic rewarming was initiated and all aortic commissures were resuspended with hori-

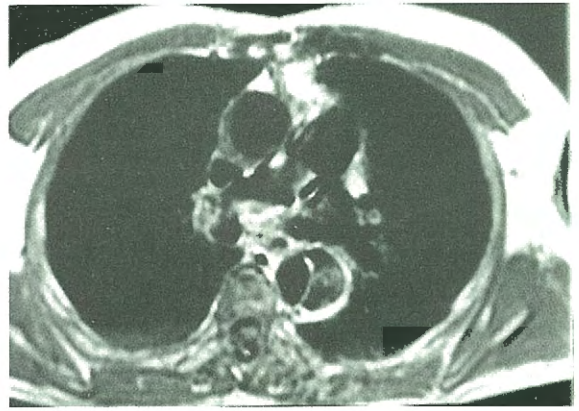


Figure 3. Magnetic resonance image obtained 6 months after the operation. No flow signal was detected in the false lumen.

zontal pledgetted sutures. After completion of proximal anastomosis, terminal warm blood cardioplegia followed with retrograde warm blood infusion was applied. The air was evacuated from heart and graft by the aid of an aortic root vent while the heart was beating.

Cardiopulmonary by-pass was terminated shortly after removal of the crossclamp. The patient made an uneventful recovery and was discharged on the eighth postoperative day. Magnetic resonance imaging obtained 6 months after the operation showed complete occlusion of the false lumen (Fig. 3).

Discussion

Intimo-intimal intussusception is a rare but potentially life-threatening complication of aortic dissection. Affected patients appear to present with neurolo-

Table 1. Reported cases of intimo-intimal intussusception.

| Year | Author     | Type    | Aortic Regurgitation | Neurologic Presentation | Diagnostic Procedure | False Negative Diagnostic Procedure | Outcome |
|------|------------|---------|----------------------|-------------------------|----------------------|-------------------------------------|---------|
| 1962 | Hufnagel   | Type II | +                    | +                       | Aortography          |                                     | Dead    |
| 1962 | Hufnagel   | Type II | +                    | +                       | Aortography          |                                     | Alive   |
| 1971 | Liotta     | Type II | NA                   | NA                      | NA                   |                                     | Dead    |
| 1971 | Liotta     | Type II | NA                   | NA                      | NA                   |                                     | Alive   |
| 1980 | Symbas     | Type II | +                    | +                       | Aortography          |                                     | Alive   |
| 1984 | De Bakey   | Type II | -                    | +                       | Aortography          |                                     | Alive   |
| 1988 | Reitknecht | Type II | -                    | +                       | Aortography          |                                     | Alive   |
| 1988 | Kastan     | Type II | -                    | -                       | Aortography          | CT                                  | NA      |
| 1988 | Kitayama   | Type I  | +                    | -                       | Aortography          |                                     | Alive   |
| 1992 | Lourie     | Type II | -                    | +                       | TEE                  |                                     | Alive   |
| 1993 | Nelsen     | Type II | +                    | +                       | CT                   |                                     | Alive   |
| 1993 | Ruvolo     | Type II | +                    | +                       | TEE                  | CT, TTE,                            | NA      |
| 1994 | Lijoi      | Type I  | +                    | +                       |                      | CT, TTE, Aortography                | Alive   |
| 1994 | Baciewicz  | Type I  | +                    | +                       | MRI                  | Aortography                         | Alive   |
| 1995 | Hudak      | Type II | +                    | +                       | TEE                  | CT                                  | NA      |
| 1997 | Alhan      | Type II | +                    | +                       | Aortography          | CT, TTE                             | Alive   |

CT= computed tomography; MRI = magnetic resonance imaging; NA = not available; TEE = transesophageal echocardiography; TTE = transthoracic echocardiography

gical findings rather than the severe chest pain often associated with aortic dissection (11 of 15 reported patients). This may delay or obscure diagnosis, with a consequent increase in morbidity and mortality; and may explain the rarity of reported cases (1-13). (Table 1).

Most cases described have been a type II dissection beginning above the coronary ostia with the intussusception in the aortic arch (12 of 15 reported patients). It has been thought that the origin of the great vessels causes the intussusception to stop in the arch (1). However, intussusception may also accompany type I dissection, as in our case. In this situation, the false lumen courses the lesser curvature of the arch extending to the descending aorta.

The intussusception can cause obliteration of the arch vessels and impair blood flow to the brain or upper extremities (1, 3-6, 8,9,11) as in this case. Clinically, intimal intussusception should be suspected in the presence of cerebral or limb ischemia or weakened carotid or upper extremity pulses associated with a dissection. Occasionally, aortic intussusception may result in "true stenosis" of the aortic lumen and occlusion of vessels originating from the arch (4,5).

Aortic insufficiency is a common finding in intussusception (9 of 15 reported patients) and may be the only suggestive finding of dissection in patients with false negative CT and aortography (11). Although intimal intussusception is a rare complication of aortic dissection, it may have grave implications if unrecognized. Every diagnostic tool except transesophageal echocardiography have been shown to yield to false negative diagnosis (Table 1). Neurologic presentation associated with severe aortic regurgitation must raise the probability of aortic dissection complicated with intimal intussusception.

## REFERENCES

1. Hufnagel CA, Conrad PW: Intimo-intimal intussusception in dissecting aneurysms. *Am J Surg* 1962; 103: 727-31

2. Liotta D, Hallman GI, Milam JD, Cooley DA: Surgical treatment of acute dissecting aneurysm of the ascending aorta. *Ann Thorac Surg* 1971; 12: 582-92

3. Symbas PN, Kelly TF, Vlassis SE, Drucker MH, Arensberg D: Intimo-intimal intussusception and other unusual manifestations of aortic dissection. *J Thorac Cardiovasc Surg* 1980; 79: 926-32

4. DeBaKey ME, Lawrie G: Intimal intussusception: unusual complication of dissecting aneurysm. *J Vasc Surg* 1984; 1: 566-8

5. Reitknecht FL, Bhayana JN, Lajos TZ: Circumferential intimal tear causing obstruction of the aortic arch: an unusual complication of aortic dissection. *Ann Thorac Surg* 1988; 46: 100-1

6. Kastan DJ, Sharma RP, Keith F, Shetty PC, Burke MW: Intimo-intimal intussusception: an unusual presentation of aortic dissection. *AJR* 1988; 151: 603-4

7. Kitayama H, Matsuno S, Yamada T, Ueda M, Oka H, Ando F: A surgical treatment of a DeBaKey type-I dissection of the aorta with intimo-intimal intussusception. *Nippon Kyobu Geka Gakkai Zasshi* 1988; 36: 1017-20

8. Lourié JK, Appelbe A, Martin RP: Detection of complex intimal flaps in aortic dissection by transesophageal echocardiography. *Am J Cardiol* 1992; 69: 1361-3

9. Nelsen KM, Spizamy DL, Kastan DJ: Intimointimal intussusception in aortic dissection: CT diagnosis. *AJR* 1994; 162: 813-4

10. Ruvolo G, Voci P, Greco E, et al: Aortic intussusception: a rare presentation of type A aortic dissection evidenced by transesophageal echocardiography. *J Cardiovasc Surg (Torino)* 1993; 34: 385-7

11. Lijoi A, Scarano F, Canale C, et al: Circumferential dissection of the ascending aorta with intimal intussusception. *Tex Heart Inst J* 1994; 21: 166-9

12. Baciewicz FA: Circumferential dissection of the ascending aorta with intimal intussusception. *Tex Heart Inst J* 1994; 21: 242-3

13. Hudak AM, Konstadt SN: Aortic intussusception: a rare complication of aortic dissection. *Anesthesiology*; 82: 1292-4

14. Alhan C, Çakalağaoğlu C, Baçgel F, et al: Two-year experience with integrated myocardial management. *Türk Kardiyol Dern Arş* 1996; 24: 528-33