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Case Report

Management of acute Type A aortic dissection

Lt Col A. Menon^{a,*}, Brig A.A. Garg, vsm^b, Brig S. Rai^c, Col G.S. Nagi^d,
Lt Col G. Kumar^a, Lt Col N. Tiwari^e, Lt Gen S. Rohatgi, vsm^f

^a Classified Specialist (Surgery & CT Surg), Military Hospital (Cardio Thoracic Center), Pune 40, India^b Commandant, Military Hospital Mathura, PIN-2891001, India^c Commandant, 92 Base Hospital, C/O 56 APO, India^d Senior Advisor (Surgery & CT Surg), Army Hospital (R&R), New Delhi, India^e Classified Specialist (Surgery & CT Surg), INHS Asvini, Mumbai, India^f DG (Org & Pers), O/o DGAFMS, New Delhi, India

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Introduction

Acute aortic dissection is a catastrophic event of sudden onset in which blood leaves the normal aortic channel through an intimal tear, rapidly dissecting the layers of the media to produce a false channel. It may involve the ascending aorta and extend to the aortic bifurcation, the so-called Stanford Type A (Fig. 1). Classically, these patients mostly tend to be younger. A minority have a discrete re-entry intimal tear at the distal end of the dissection which puts the false channel in communication with the aortic lumen distally as well as proximally.¹

We report the unusual case of a 68-year-old retired male who presented with an atypical presentation of innocuous transient acute right lower limb pain due to acute Type A aortic dissection extending from the ascending aorta into the left common iliac artery and its successful urgent surgical management.

Case report

A 68 year old male patient presented to a tertiary centre with chest discomfort and acute right lower limb pain. Evaluation revealed absent right femoral pulsations and a cooler foot. He was suspected to have an acute right lower limb ischaemia and worked up for emergency femoral embolectomy. However, over the next 2 h, his limb pain subsided dramatically with continued pulselessness. Patient complained of persisting chest pain. ECG was noncontributory and colour Doppler suggested normal flow in lower limbs. The possibility of an acute aortic dissection extending to the left common iliac artery, with intimal flap occlusion and subsequent flap tear re-entry to the right common iliac artery (causing relief of right sided ischaemia) was suspected. Urgent CT scan revealed a Type A aortic dissection originating from the proximal ascending aorta, involving origin of arch vessels, extending upto the aortic bifurcation and into the left common iliac artery (Fig. 2). The origin of left main coronary artery and left renal artery was from the false lumen.

* Corresponding author. Tel.: +91 6171 (Mil), +91 8805109966 (mobile).

E-mail address: ajoymenon@hotmail.com (A. Menon).

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Fig. 1 – Schematic representation of Stanford Type A aortic dissection.

The challenge was to immediately tackle the dissection before it extended into cerebral vessels distally and aortic valve or coronaries proximally – an event which would have completely changed the scope of surgery with attendant increase in the risk of mortality.

Hence he was rapidly transferred to a cardiothoracic unit and placed on the OT table within an hour. Intra-operative transesophageal echo confirmed above findings with normal aortic valve.

Fig. 2 – CT thorax showing Type A dissection with intimal flap, false lumen in DTA.

Operative technique involved median sternotomy with right axillary arterial cannulation, two-stage standard and femoral venous cannulation, and left ventricular vent via the right superior pulmonary vein.

Myocardial protection was through both retrograde and coronary ostial cardioplegia. Antegrade cerebral perfusion was given through right axillary artery and arch reconstruction was done under DHCA (deep hypothermic circulatory arrest). Core cooling was done to nasopharyngeal temperature of 15 °C.

Intra-operatively, ascending aorta was found dilated with extra mural haemorrhage and a nearly circumferential dissection flap with direct extension from aortic sinuses to descending aorta and beyond. The intimal tear was just below origin of brachio-cephalic branch with proximal extension into the aortic non-coronary and left coronary sinuses. The coronary ostia were intact.

The dissection flap was excised from the supracoronary aorta up to the undersurface of the arch. Ascending aorta and the hemiarch were independently replaced using 26 mm Albograft, under DHCA. Bioglue® (albumin + glutaraldehyde) was used to reinforce disrupted aortic layers. The aortic valve was then resuspended and tested and found competent (Fig. 3). This repair hence obviated the need for aortic valve replacement (AVR). Thereafter the two grafts were joined (Fig. 4).

Subsequently, aortic cannula and root vent were positioned into the graft and deairing was completed. After adequate bypass support and rewarming, patient was weaned off and decannulated. Sternal closure was routine.

Fig. 3 – Dual graft anastomosis, antegrade cerebral perfusion and valve resuspension.

Fig. 4 – Completed ascending aortic and hemiarch replacement.

Recombinant activated factor VII was used to further minimize postoperative haemorrhage.

Postoperatively, the patient had no sequelae barring transient hoarseness due to left recurrent laryngeal neuropraxia and was discharged on the sixth day. On follow up, he is haemodynamically stable and performs all activities of daily living.

Discussion

Acute Type A aortic dissections represent one of the most challenging emergencies in surgery. Left untreated, it is a highly lethal event, where 40% of patients with dissection involving the ascending aorta die immediately, 70% within first 24 h, 94% within the first week, and 100% within 5 weeks.^{2,3}

In asymptomatic patients, a high index of suspicion is necessary.^{1,3} In this case, the patient was beyond the expected age-group for a Type A dissection.¹ In addition, he had an atypical presentation with unilateral transient groin pain and chest discomfort, an innocuous presentation of this emergency. Misleading as they maybe, the absence of aortic regurgitation, a normal ECG and peripheral colour Doppler only indicate a subset of type A dissections where the patient is fortunate to have aortic root sparing disease with distal re-entry of flow.

However, the real urgency in this case was to prevent catastrophic arch/cranial vessel involvement as well as proximal extension of the dissection into aortic valve sinuses and coronaries. If delayed, the scope of surgery would have extended far beyond a supracoronary replacement, involving AVR and coronary reimplantation, with resultant higher morbidity and mortality.^{4,5}

Surgical technique should aim to minimize cerebral damage, and prevent coronary ischaemia in addition to ensure salvaging end-organs from malperfusion.⁴

This requires intense teamwork and in the present case was achieved by close anaesthetic and cardiovascular monitoring, graft selection, meticulous deairing and cardioprotection in addition to DHCA.

DHCA represents the final frontier in surgery where the core temperature is cooled to 15–20 °C, circulation stopped, and there is no brain activity with the patient in a state of suspended animation. This enables the surgical team to replace the aortic arch. Cerebral perfusion is maintained with axillary artery cannulation. Also, rapid establishment of CPB via axillary and femoral cannulation and sound myocardial protection aids a successful outcome.

We found intra-operative Biogluce and postoperative Recombinant activated factor VII to be useful in overall haemostasis.^{1,6,7}

The present case highlights the importance of meticulous clinical examination to reach a prompt diagnosis, urgency and well-planned execution of surgery where any delay could prove disastrous.

Conflicts of interest

All authors have none to declare.

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