

Acute Aortic Occlusion: Time To Awake, Be Aware And Act

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Abstract

Purpose: Acute aortic occlusions most commonly results, either from aortic saddle embolism or from thrombosis of an atherosclerotic abdominal aorta. The purpose of this study is to report the management of acute aortic occlusions and to analyze factors that influence the outcome.

Method: This was a retrospective analysis of 19 consecutive patients from 2002-2005, referred to our vascular surgery unit for management. Patients presented with both vascular(limb ischemia) as well as neurological(motor/sensory)deficits. Most of the patients had underlying co-morbid conditions like coronary artery disease, diabetes, and hypertension. The diagnosis was mainly clinical, however they were further assessed with color duplex, magnetic resonance(MRI), echocardiography, & angiography as per the requirement. Younger patients were also investigated for hypercoaguable states. Embolism was the cause in 12 patients, and thrombosis in 7 patients. Circulation was restored in 13 patients (thromboembolotomy - 9 pts, aorto bifemoral bypass - 2). Two patients were managed with endovascular interventions (thrombolysis alone 1 & thrombolysis followed by aortic stent -1).

Results: The overall mortality rate was 21.0% (in 3 years). Six patients(31.0%) who presented with B/L lower limb irreversible ischemia was subjective to high above knee amputation, another four patients required intensive care units following procedure due to pre-existing renal & cardiac impairments. Patients with valvular heart diseases and left ventricular thrombus were referred to cardiac surgeons and cardiologists for definitive procedures. All the patients were discharged on best medical therapy & anticoagulation.

Conclusion: Acute aortic occlusion is uncommon but a catastrophic event with high morbidity and mortality. Clinicians must have a high index of suspicion in patients who present with painful paresis or paraplegia with absent pulses in legs. It is of primary importance that these patients should be referred to an appropriate center for further management. Prompt diagnosis and revascularization by the simplest operations are required to decrease morbidity and mortality. Prompt anticoagulation is suggested in patients with embolic occlusions to minimize a high incidence of recurrent arterial embolism.

INTRODUCTION

Acute aortic occlusion – termed as a “multifaceted catastrophe” is a rare condition (1). The reported series are therefore both small & few in number (2, 3, 4, 5,6). Chronic occlusion is clearly a different disease entity and principles of diagnosis & management do not apply to the acute aortic occlusion. Even when diagnosed promptly, management requires thorough understanding of underlying factors that contribute to the development of occlusion. Post operative mortality rates of up to 100% have been reported, so that a quarter of a century ago the condition was regarded as “irreversible vascular emergency” (2). With refinement in surgical technique & intensive care treatment, the mortality is still as high as 33% to 62.5 % (3). The aim of the present

study is review our experience with 19 patients presented in different manners, role of various available modalities like surgery, endovascular & medical and the factors influencing the outcome in the overall management.

PATIENTS & METHOD

Medical records of 19 consecutive patients treated for aortic occlusion caused by either embolism or thromboembolism were reviewed. There were total of 19 patients over a three years period (2002-2005) admitted in Nizam's Institute of Medical Sciences, Hyderabad, India. Twelve were men & seven were women. Age of the patients ranged from 25 to 80 years. Twelve patients were hypertensive. Nine patients were diabetic & 6 patients had significant coronary artery disease. Ten patients were current smoker with two of them

having non disabling claudication.

PRESENTATION

Presentation included acute limb ischemia in 13 patients with pain & paresthesia. In this six patients had paresis. Six patients were initially erroneously diagnosed by neurophysician & orthopedician as case of acute disc problems & then later they referred to us with irreversible limb ischemia and paraplegia. Four patients were in arterial fibrillation. Serum urea & creatinine were abnormal in eight and five were hyperkalaemia. Duration of symptoms was more than 12 hrs in all patients.

CAUSE

All patients were underwent duplex scanning of the limbs & aorta & cardiac assessment with echocardiography on presentation. In all twelve patients with embolic occlusion, the aorta was normal & emboli originated in the heart. Eight of these had Lt. ventricular thrombus diagnosed by Echo. Another four had documented valvular heart disease which was believed to be the source of aortic embolus. All except one female had acute aortic occlusion due to embolus. Seven patients had acute thrombosis & three of them had underlying atherosclerotic occlusion disease. All these patients were diabetic and predominantly males. In three patients, diagnosis of “hypercoagulable state” was eventually confirmed by hematological studies. Two patients had a hemoglobin concentration of greater than 16 g/dl, one patient has thrombocytosis of greater than 400000 platelets per mm.³ Homocystine levels were significantly high in two (greater than 50micro mol/l). These three patients were between age group of 25-35 years.

MANAGEMENT

Preoperative angiogram was performed in four patients (Figure A and B). Two patients underwent angiography after failed embolectomy. In remaining patients diagnosis was obvious i.e. either embolus or thrombosis. After the diagnosis of aortic occlusion was established, patients were immediately given heparin, while measures were taken to improve their state of hydration, cardiovascular function & correction of electrolyte imbalance.

Figure 1

Figure A: Saddle embolism on angiography

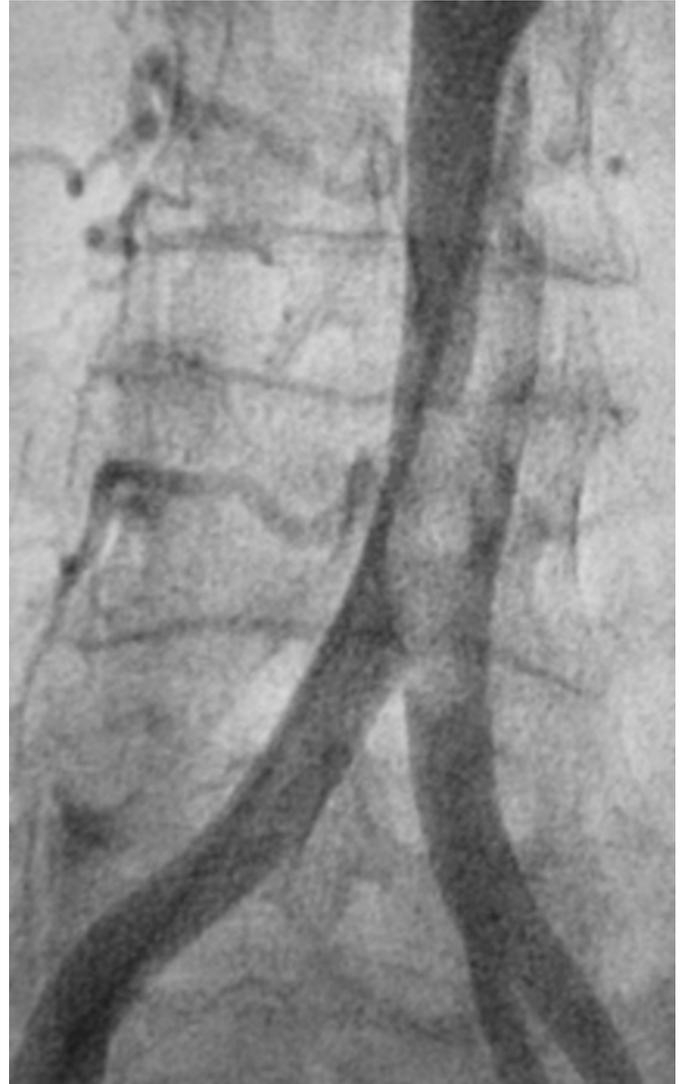


Figure 2

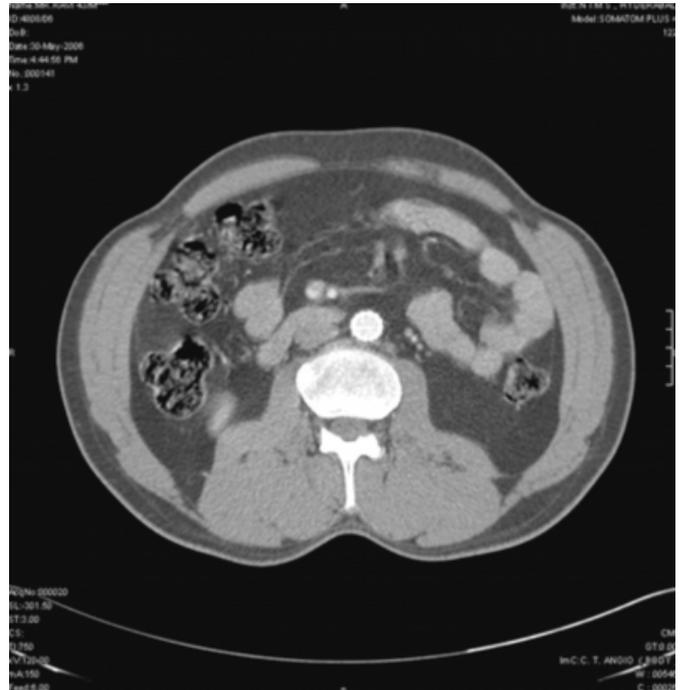
Figure B: Aortic thrombus on angiography



Eleven out of nineteen patients of thromboembolism were subjected to emergency B/L transfemoral thromboembolectomies. Two patient of acute thrombosis was given thrombolytic therapy with urokinase (as per STILE Trial). One patient was considered for aortic stenting after thrombolytic therapy in view of significant stenosis (Figure C). Six patients who presented with irreversible ischemia, underwent B/L high above knee amputation.

Figure 3

Figure C: CT Angiography showing aortic stent in situ, post thrombolysis



RESULTS

Circulation was restarted in 9 patients after B/L thromboembolotomy out of 11. Patients with failed thromboectomies were subjected to angiography & found to have underlying significant aortoiliac disease. These two patient underwent aortic bifemoral bypass with synthetic graft for its correction. All the patients who were admitted with neurological deficit had gradually complete resolution of neurological symptoms after restoration of circulation. Two patient, who underwent thormbolysis, underwent check angiography after 72 hrs & there was complete dissolution of the thrombus, but one patient had underlying distal aortic lesion. This patient was subjected for distal aortic stent placement. Patients with valular disease & LV thrombus were referred to cardiologists / cardiac surgeons for further treatment.

There were four deaths (in 3 years). First, an elderly lady expired immediately after B/L embolectomy due to reperfusion syndrome. Second patient died on 5th post operative day after aortic bifemoral bypass due to massive pulmonary embolism. Two B/L above-knee amputees expired during 2 years of follow-up. Four patients required ICU stay due to underlying, significant coronary artery disease & reperfusion syndrome. Bilateral leg fasciotomy was done in 8 patients.

DISCUSSION

Acute aortic occlusion is an uncommon occurrence judging by the experience of various authors who have reported small series seen over extended time periods^(2,3,4,5,6).

Although the present series comprises only 19 patients, to our knowledge, it represents the largest reported experience of the condition in a short period of 3 years to date.

The present study confirms that acute aortic occlusion should be considered when there is sudden onset of B/ L leg pain, pallor & paresthesia progressing to paralysis, associated with characteristic mottling. Clinical examination of peripheral pulses in these cases is mandatory.

Contrary to what might be expected, not all patients with sudden occlusion of abdominal aorta are admitted with symptoms of severe ischemia. This was amply demonstrated in our series, in which 6 out of 19 patients were diagnosed with symptoms other than lower extremity ischemia. These patients were initially believed to have spinal cord compression. The symptoms in this group ranged from sudden onset of lower extremity paresthesia to frank paraplegia. 6 of such patients later developed advanced ischemia and gangrene prior to a proper diagnosis. Hence an early diagnosis remains the key factor for an optimum outcome. Clinicians must have a high index of suspicion in these cases. Although in majority of cases the diagnosis is clinical, a simple readily available and non invasive approach with duplex scanning of the aorta, iliac and common femoral arteries helps in many cases. In severe occlusive disease, its sensitivity reaches 91% and its specificity 93%.⁽⁷⁾

So, due to delay in establishing the diagnosis, most of the patients will have high proportion of abnormal renal function, hyperkalemia, myoglobinuria & threatened limb, emphasizing the need for rapid restoration of blood flow⁽⁸⁾. If the diagnosis is obvious patients should be taken up for emergency thromboembolectomies with correction of metabolic changes. Angiography in these particular situations does not appear to alter the management. However, besides confirming the diagnosis, angiography play a vital role in assessing & planning management. It demonstrates extension of thrombus to the renal arteries, status of the distal circulation & also delineates the status of the visceral circulation. It is mandatory after failed procedures (i.e. thromboembolotomy) to confirm the underlying disease for proper management (as seen in two of our patients where significant aorto iliac disease was

diagnosed by angiography).

In order to minimize the peri & post operative complications, it is emphasize that such patients should be well hydrated & their cardiovascular status as well as electrolyte imbalance should be corrected⁽⁹⁾. In addition, it is routine practice in our unit to use mannitol prior to aortic clamping & to run patients on low dose dopamine. Peri-op monitoring is also vital with arterial & central venous pressure lines being used in all patients. Controlled limb reperfusion (after anastomosis) is another technique which may preserve skeletal muscle and nerve function and prevents local and systemic complications caused by reperfusion damage⁽¹⁰⁾.

Because embolism is more common and this group of patients offers a poor operative risk, initial balloon catheter embolectomy under local anaesthesia is reasonable in cases where the nature of occlusion is in doubt. This procedure is of choice even in patients with acute thrombosis with no evidence of pre-occlusive disease. Most of these patients, predominantly females had a successful outcome after embolectomy. For patients with underlying occlusive diseases, the decision must be then taken for a definitive bypass procedure. Aortic bifurcation grafting is probably the operation of choice if the patient can with stand the operation and axillo bifemoral bypass is a reasonable alternative in the very high risk patient. Simple thromboendarterectomy is associated with a high incidence of re-occlusion. Two of our patients underwent aorto-bifemoral bypass grafting with synthetic graft after failed thromboembolectomy. Careful consideration should be made if there is a need for fasciotomy. We usually prefer doing fasciotomies as most of our cases present late to us. Eight of such our patients underwent b/l leg fasciotomies.

The role of thrombolytic therapy in acute aortic occlusion is emerging^(11, 12). Recent reports have proved both safety and efficacy. This may be preferable therapy in patient with hyper coagulable states because this subset of patients fared poorly with surgical intervention this despite normal arteries and good cardiac function⁽¹³⁾. Two of our patients were successfully managed with thrombolysis, one of which required aortic stent for underlying aortic lesion.

In all the patients with embolic occlusions a prompt anticoagulation is suggested to minimize a high incidence of recurrent arterial embolism and they should be referred to cardiologists/cardiac surgeons at the earliest.

Prognosis in these patients might be improved by reducing the duration of ischemia by rapid diagnosis and emergency revascularization, better control of metabolic factors, controlled limb perfusion and liberal fasciotomy whenever needed. Females with embolic episodes, have a better outcome than a male diabetic with thrombosis.

CONCLUSION

Acute aortic occlusion is an infrequent occurrence. Symptoms other than ischemia at the time of presentation may mislead the treating physician and delay the diagnosis in as much as one third of the patients. Once the diagnosis is made, therapy should be based on sound clinical judgment supported by hemodynamic parameters. The management spectrum ranges from medical therapy, simple thromboembolectomy, extra anatomic bypass and aortic reconstruction to thrombolytic therapy. During surgical interventions, controlled limb reperfusion and fasciotomies seems to lower the risk of reperfusion injuries. Medical therapy should be continued during follow up as these patients are at very risk of developing other manifestations of arterial occlusive and thrombotic disease.

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