Objective: To present a rare complication of the use of Cough Lok following coronary artery surgery. Methods: Case report. Results: Report of axillary artery thrombosis following use of Cough Lok. Conclusions: Axillary artery thrombosis as a complication related to the use of the Cough Lok belt has not been previously reported. This rare complication was treated with endovascular thrombolysis. Staff awareness is the most important factor for its prevention.

1. Introduction

Thrombosis of the axillary artery is a rare complication following coronary artery bypass grafting. It has been described most commonly secondary to trauma (fracture of the clavicle or the head of the humerus, penetrating injuries), other orthopaedic injuries (throwing injuries in athletes, isometric exercise), use of armpit crutches or from electric injury [1–6]. We report a case of axillary artery thrombosis related to the use of a Cough Lok belt following sternal rewiring.

2. Case report

An overweight 65-year-old man was admitted to our hospital with unstable angina and left lower lobe pneumonia. Six days later with his chest optimized, he underwent coronary artery bypass grafting (LIMA, left radial, and SVG x 4) which was performed with the use of cardiopulmonary bypass.

One week later he developed sternal dehiscence from persistent coughing which was debrided and closed with a modified Robicsek procedure and irrigated with dilute betadine for 48 h. The chest was then supported externally by using the Cough Lok belt (Fig. 1) (Hawksley Technology, Sussex, UK).

Three days later he developed an acutely ischaemic forearm. Colour duplex and angiography (Fig. 2) showed occlusion at the left axillo-subclavian artery junction. Ecocardiographic studies did not identify a cardiac source of emboli and repeated electrocardiogram confirmed sinus rhythm. In addition his coagulation screen revealed no hypercoagulability and there was no low cardiac output syndrome or dehydration at any time.

Following advice from the vascular surgeons he received local intra-arterial thrombolytic therapy via the angiographic catheter for 24 h with rTPA and anticoagulation with an intravenous heparin infusion. Repeat angiogram the next day confirmed lysis of the thrombus with good flow in the brachial artery. It also revealed an underlying 40% stenosis in the third part of the subclavian that was not amenable to angioplasty. Clinically the forearm and hand had recovered fully and the patient was started on long-term oral anticoagulation treatment.

3. Results

Axillary artery thrombosis as a complication related to the use of the Cough Lok belt has not been previously reported.

4. Discussion

It is generally accepted that in order to provide maximum support to the chest the Cough Lok needs to be worn across...
the mid part of the sternum. In order to achieve this the belt is applied and tightened while the arms are abducted. In this case we believe that the position of the belt worn high up in the axilla caused increased traction on the pectoralis minor muscle towards the subclavian area leading to compression of the axillary artery and predisposing to thrombosis. The mechanism of compression from the pectoralis minor muscle has been previously reported [7]. This was made worse in this case by the underlying subclavian stenosis.

In heart surgery other predisposing factors that can be considered responsible for axillary thrombosis are the following: low cardiac output, hyper-coagulation disorders, arrhythmias, embolism, dehydration, thoracic muscular flaps and changes in the forces applied on the sternum following excision, rewiring or reconstruction of the sternum.

The Cough Lok belt is commonly used to support the sternum following rewiring and also to prevent sternal instability in patients at high risk for sternal dehiscence for medical (obesity, osteoporosis, diabetes, COPD, persistent cough, elderly, poor nutritional status, immunosuppression) or surgical reasons (harvesting of both IMA, technical errors during sternal opening or closure). An alternative device is the sternal harness which involves a similar sternal belt with shoulder straps in an attempt to prevent it slipping off. However, this does not effectively prevent the belt from moving upwards into the axilla and its use may not have prevented this complication.

In our experience the Cough Lok is often either badly positioned, too tight or too loose. The manufacturer of the Cough Lok does not give any advice on the use and positioning of the belt, so it is important to be aware of this important and preventable complication. We believe that intermittent use of the belt in association with a prevention policy (staff awareness – medical, nursing and physiotherapists) and also education of the patient can be a useful strategy. Our policy is for the belt to be worn during periods of mobilization and physiotherapy ensuring periods of non-use when the patient is inactive. Our monitoring involves palpation of the distal arm pulses and pulse oxymetry of both hands at the time of positioning the belt as well as regular inspection of the belt position with any adjustments made as required. The pulses are checked twice a day during the regular nursing observations as well as by the surgical team on ward rounds.

Another complication of the belt which is easily avoided is that because the belt is a woven synthetic material it may cause rubbing over the sternal wound and increase the incidence of sternal wound infection due to the humid environment created under the belt. It is our policy that all patients wearing the Cough Lok belt should have their wounds dressed even if they are healed.

The management of axillary thrombosis includes intra-vascular intervention (thrombolysis, angioplasty, stenting, thrombectomy) or surgical reconstruction.

References


Fig. 1. Chest X-ray showing the modified Robicsek procedure and the position of the Cough Lok.

Fig. 2. Digital subtraction angiograms showing (A) the axillary artery thrombosis and (B) the underlying stenosis after thrombolysis.