

Compression Ultrasonography for False Femoral Artery Aneurysms: Hypocoagulability is a Cause of Failure

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Objectives: false femoral artery aneurysm is an occasional complication of percutaneous cardiovascular radiological procedures. Compression ultrasonography causes thrombosis non-invasively, reducing need for operative intervention. The technique fails in a proportion of cases. Analysis was undertaken to identify causes of failure.

Design: prospective open study.

Materials and Methods: patients presenting with false femoral artery aneurysm since 1984 were identified from a computerised database (BIPAS). Since 1993 compression ultrasonography has been performed as first line treatment according to a standard protocol. Prospectively collected ultrasonographic data and case notes were reviewed to identify causes of failed compression.

Results: false femoral artery aneurysm occurred as a complication in 32/26 687 (0.12%) cardiovascular radiological procedures. Eighteen aneurysms were treated by compression. The technique was successful in 11/18 (61%) cases but primary failure occurred in seven cases. Six out of seven had bleeding abnormalities (Chi-squared analysis with Yates correction 10.55, $p=0.0012$), four were anticoagulated and compression was subsequently successful following reversal of warfarin therapy in three of these patients. In 4/18 cases surgical repair was necessary.

Conclusions: compression ultrasonography is an effective treatment of false femoral aneurysms, however, hypocoagulability is a significant cause of failure. For patients in whom anticoagulation cannot be reversed, primary surgical repair should be considered.

Introduction

Recent reports¹ have re-emphasised the benefits of compression ultrasonography as a first line of treatment for iatrogenic false femoral aneurysms, provided the expertise to perform this technique is available.² This non-invasive method of treatment has been reported to have high success and low complication rates. A review of cases in which ultrasound guided compression was unsuccessful attempted to identify causes of failure.

Patients and Methods

Since 1984 data on all patients requiring vascular surgical intervention has been collected prospectively on a computerised database (BIPAS). This database was used to identify patients undergoing direct surgical repair of false femoral artery aneurysms. Log

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books and computerised records in the Department of Radiology were reviewed to find the total number of angioradiological interventions performed over the study period. Patients undergoing ultrasound guided compression treatment were identified from prospective records in the Vascular Studies Laboratory.

Results

Over the last 13 years, 14 false femoral artery aneurysms have required surgery following 26 687 cardiovascular radiological investigations or interventions.

Since 1993, 18 false aneurysms have been treated by compression ultrasonography. The aneurysm jet being located and compressed with the 5 MHz probe of an ATL Ultramark 9 colour-flow duplex scanner (Fig. 1). Up to 3 × 10 min compressions are performed per treatment.² Compression failed to thrombose a false aneurysm in the second patient in this series, and since then six further compressions have failed. Four failures were in patients who were anticoagulated on warfarin

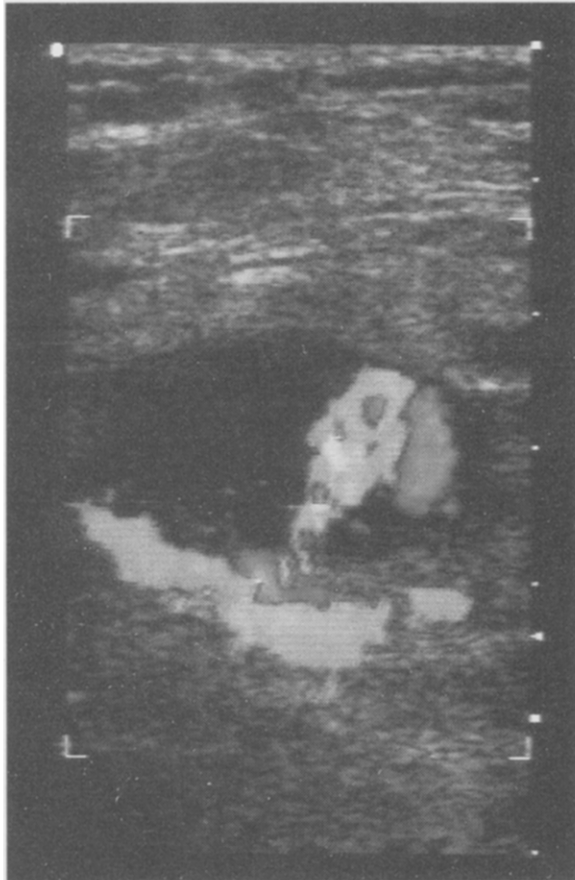


Fig. 1. Duplex image of false femoral artery aneurysm and jet feeding the aneurysm from the common femoral artery. Compression is aimed at the jet.

Table 1. Results of compression ultrasonography for treatment of false femoral artery aneurysms.

	Successful compression	Unsuccessful compression
No bleeding disorder	11	1
Bleeding disorder	0	6

Chi-squared analysis 10.55, $p=0.0012$

at the time of treatment. Three of these were successfully treated by compression following reversal of anticoagulation. One patient had thrombocytopenia and one patient had a prolonged bleeding time and is currently undergoing investigation. Both these patients needed surgical repair (Table 1). A total of 14 false aneurysms (77.8%) were successfully treated by compression ultrasonography.

Discussion

The incidence of clinically apparent iatrogenic false femoral aneurysm following femoral artery catheterisation is reported to be approximately 1%.³ An in-

cidence of up to 14% has been reported when screening for false aneurysm is carried out using duplex imaging after arterial cannulation.⁴ It was found to be much lower in the current series (0.12%). It is recognised that the size of the arterial catheter is one factor involved in the rate of complications following cardiovascular radiology,⁵ but many arteriograms in our unit are now performed using small catheters⁶ which may be a contributing factor in the observed low incidence of false aneurysms.

The introduction of duplex-guided compression has markedly reduced the need for surgical intervention, but in some cases does not thrombose the aneurysm successfully. We have noted that warfarin anticoagulation is a relative contraindication for compression ultrasonography since there was an observed 100% failure rate in these patients. Other centres have also reported a higher failure rate in anticoagulated patients.⁷ Delayed compression can be performed provided it is safe to reverse anticoagulation. This was undertaken in three patients, the remaining patient requiring surgical intervention. Thrombocytopenia or other hypocoagulable states may also reduce the success of guided compression.

Compression ultrasonography is an effective non-invasive tool for the management of iatrogenic false femoral aneurysms providing anticoagulation can safely be reversed prior to compression and bleeding dyscrasias are controlled.

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