Acute Mesenterial Ischaemia Following Percutaneous Angioplasty of the External Iliac Artery in a Patient with Extensive Atherosclerosis

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WHAT THIS PAPER ADDS:
This short report discusses an unusual complication of iliac percutaneous subintimal angioplasty. Patients with atherosclerosis are prone to concomitant mesenterial artery occlusive disease and subsequent collateral formation. This report emphasises the need for rigorous diagnostic work-up and for caution in planning percutaneous iliac revascularisation in such patients.

Introduction: Subintimal angioplasty is a well-recognised treatment method for stenosis and occlusions in peripheral arterial occlusive disease. In patients with extensive atherosclerosis, large pelvic collateral networks may signify concomitant mesenterial artery disease.

Case report: We describe a patient in whom a percutaneous subintimal angioplasty of the external iliac artery was complicated by acute bowel ischaemia due to occlusion of important mesenteric collaterals. After urgent bypass surgery, the patient made a full recovery.

Conclusion: This report emphasises the importance of recognising mesenteric collateral formation from the iliac arteries in endovascular procedures, as the mesenterial vascularisation may depend heavily on it.

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Article history: Received 5 June 2012, Accepted 4 November 2012, Available online XXX

Keywords: Mesenteric artery ischaemia, Angioplasty, Angioplasty/adverse effects, Subintimal angioplasty, Peripheral arterial disease, Case report

INTRODUCTION
Mesenteric artery stenosis is a common finding in the Western population. Progression to symptomatic ‘angine abdominale’ only occurs in a minority of the population, due to the collateral-forming ability of the mesenteric circulation.1 We present a case in which percutaneous subintimal angioplasty of the external iliac artery led to acute mesenteric ischaemia in a patient with extensive atherosclerosis, who had no symptoms of mesenterial ischaemia beforehand.

REPORT
Patient A (70 years, female), with a history of smoking, dyslipidaemia and peripheral artery disease, presented with a non-healing ulcer on her right ankle. She experienced exercise-related pain in the same leg. She had no history of abdominal pain or weight loss. Duplex ultrasonography visualised an occluded external iliac artery (EIA) down from the bifurcation. The aorta, common iliac artery (CIA) and internal iliac artery (IIA) appeared open and, although calcifications were seen, no significant stenosis appeared. The right common femoral artery was open and received blood flow from epigastric artery collaterals. The visceral circulation was not visualised. Percutaneous subintimal recanalisation was performed in retrograde direction from the right femoral artery with re-entry just distally to the ostium of the IIA. Abundant collateral vasculature to the intestines was seen, originating from the IIA and lumbar arteries (Fig. 1). An 8 cm × 8 mm bare-metal stent was placed in the EIA. Angiography showed a patent EIA with good outflow distally.

During the procedure, the patient started vomiting and developed diarrhoea. She developed cramping abdominal pain after several hours. Although she appeared haemodynamically stable and laboratory results did not provide clear directions (serum haemoglobin 6.9 mmol l−1, lactate 1.5 mmol l−1), prompt computed tomography (CT) angiography was performed. This showed a haematoma around the puncture site, proximal occlusion of the superior mesenteric artery (SMA), significant stenosis of the origin of the coeliac artery (CA) and an occluded inferior mesenteric artery with extensive collateral vascularisation (Fig. 2). The
Ostium of the right IIA showed critical stenosis and calcified plaques. The artery did not contain contrast agent, nor did the large collateral network previously visualised during the procedure. The left IIA appeared open.

A laparotomy was performed. There was no sign of bowel necrosis, but the intestines, colon and stomach appeared pale and perfusion was clearly diminished. The CA and SMA were re-vascularised using a 12/6 bifurcation graft from the aorta. Furthermore, an active haemorrhage from the puncture site in the right common femoral artery was closed. This procedure passed without further complications. The patient was discharged 11 days after surgery in a good condition. At 3 months follow-up, she did not have any gastrointestinal or peripheral symptoms and duplex ultrasonography showed a patent mesenterial graft and iliac stent.

DISCUSSION

Although chronic mesenteric ischaemia is a rare diagnosis, mesenteric artery occlusive disease is a common finding in the Western population. A randomly selected cohort consisting of asymptomatic 553 elderly Americans (mean age 77) revealed significant stenosis (>70%) of at least one mesenteric artery in 17.5%.1 Progression to bowel ischaemia is relatively uncommon, as this population had no mesenteric ischaemia-related deaths after 6 years and the presence of significant artery stenosis did not influence mortality rates in this cohort.2 Due to collateral formation, gastrointestinal symptoms typically occur if at least two out of three arteries contain critical stenosis or occlusion.3 Patients with demonstrated atherosclerosis are at a greater risk of developing mesenteric arterial occlusive disease.4 Collateral formation can arise from many locations, of which the most important are the lumbar arteries, the hypogastric circulation and the inferior mesenteric artery.

If the IIA is deliberately occluded unilaterally by a covered stent, ischaemic symptoms generally do not occur and this may be regarded as a safe procedure.5 Over-stenting of vessels with bare-metal stents does not necessarily preclude their blood flow. In this case, we hypothesise that the ostium of the IIA was oppressed by calcifications, displaced by the stent or dissection. The dependency of the mesenteric blood flow on collateral networks from the IIA

Figure 1. Angiography depicting an extensive network of collaterals originating from the internal iliac and lumbal arteries (L), which disappeared after placement of a 8 cm × 8 mm bare-metal stent in the right external iliac artery (R, arrow).

Figure 2. 3D-volume rendering shows occlusion of the origin of the SMA (arrow), with collateral filling from the coeliac trunk. The right hypogastric artery shows a critical stenosis at the origin with close relation to the bare-metal stent.
was unclear beforehand. Retrospectively, this should have been thoroughly assessed, either with duplex ultrasonography or using CT angiography beforehand, or during the angiography itself. In cases with a high risk for ischaemic complications to the mesenteric circulation, surgical or endovascular revascularisation with preservation of hypogastric circulation may be considered.

The formation of collateral networks frequently prevents patients with mesenteric artery disease to develop symptomatic bowel ischaemia. Pelvic collateral formation is a clear sign of mesenteric artery disease in patients with atherosclerosis and we advise caution on planning percutaneous revascularisation in such patients. The mesenteric vascularisation should be assessed beforehand. In any case, signs of bowel ischaemia after percutaneous angiography should be pursued aggressively to prevent major morbidity and mortality.

ACKNOWLEDGEMENTS
None.

ETHICS APPROVAL
This article did not require approval by a research ethics committee.

FUNDING
None of the authors received funding for production or editing of this paper.

AUTHORSHIP STATEMENTS
All authors have made substantial contributions to the conception and design of the article, and analysis and interpretation of the case. MG and MW drafted the article and all authors revised it critically for important intellectual content. All authors approved the final version of the article.

CONFLICT OF INTEREST STATEMENT
None of the authors states any conflicts of interest.

REFERENCES