

## CASE REPORT

## Papillary endothelial hyperplasia in a TEC coronary atherectomy specimen

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### Abstract

**Angiography in a 37 year old female with a three week history of typical crescendo angina found an 80% stenosis of the proximal left anterior descending (LAD) artery. The patient underwent percutaneous transluminal coronary angioplasty involving TEC atherectomy of the LAD artery. The specimen removed by atherectomy was found to have the appearance of papillary endothelial hyperplasia. This is an unusual histological diagnosis that occurs in association with thrombus. It is rarely found within arterial vessels and has not been reported in a coronary artery. Papillary endothelial hyperplasia is now thought to be a form of organising thrombus, probably dependent on the production of basic fibroblast growth factor by the endothelium.**

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**Keywords:** papillary endothelial hyperplasia; TEC atherectomy; thrombus; basic fibroblast growth factor

Intravascular papillary endothelial hyperplasia is a well recognised but not frequently reported histological diagnosis, first described by Masson in 1923.<sup>1</sup> Most reports are of its appearance in thrombosed dilated veins or vascular tumours. There are only four reports of its presence in arteries and none of these was in a coronary artery. We report a case in which the specimen removed by a TEC atherectomy device was found to have the histological appearance of papillary endothelial hyperplasia.

### Case report

The patient was an obese, pre-menopausal, 37 year old female, with non-insulin dependent diabetes mellitus, hypercholesterolaemia, and hypertension. She presented in April 1994 with a three week history of typical crescendo angina and underwent angiography during her first admission. This demonstrated an 80% stenosis of the proximal left anterior descending (LAD) artery (fig 1). Following failure of medical therapy she underwent percutaneous transluminal coronary angioplasty (PTCA) to the LAD artery in June 1994. A 2 mm TEC cutter was used to debulk the lesion prior to ballooning. A large fragment of material was noted in the TEC retriever bottle. The specimen was examined histologically and found to have the appearance of papillary endothelial hyperplasia (fig 2).

The patient had a good initial angiographic result but restenosed after two months. She underwent repeat PTCA with balloon only and has since been symptom free.

### Discussion

Masson regarded papillary endothelial hyperplasia as a benign proliferation of the endothelium and gave it the term "vegetant intravascular haemangioendothelioma". Pins *et al* extensively reviewed all the published reports of this condition in 1993.<sup>2</sup> They described the classification of papillary endothelial hyperplasia in three forms.

The most common type (and classified as the primary form) is its appearance in a dilated vessel—for example, a thrombosed haemorrhoidal vein. A secondary form has been reported in a vascular malformation, and

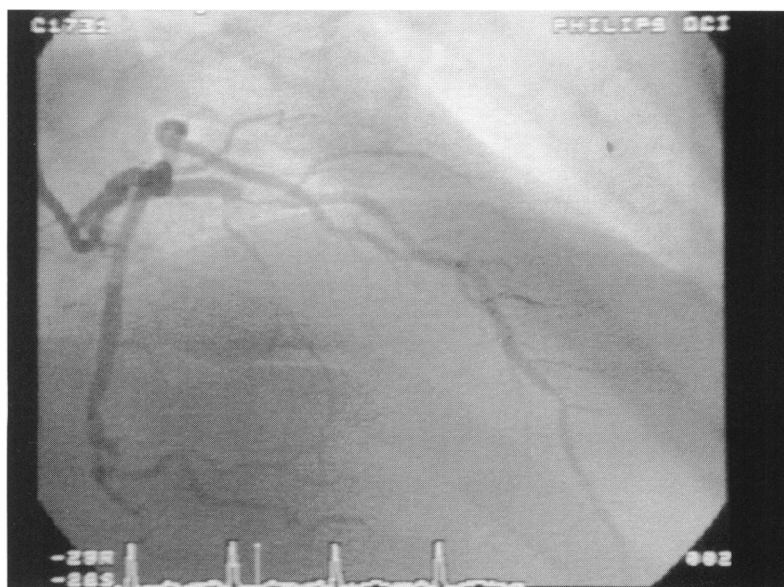


Figure 1 Angiography demonstrating 80% stenosis in the proximal left anterior descending artery.

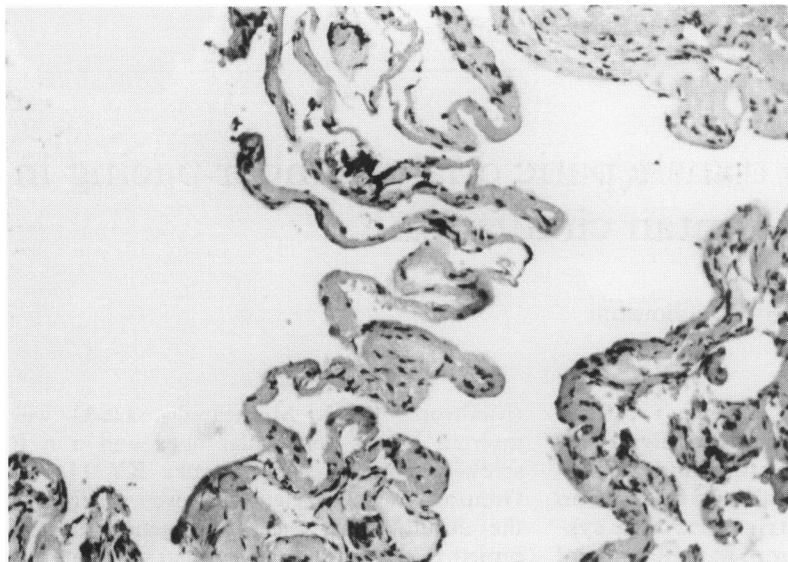


Figure 2 Sections of material removed from the coronary artery; numerous papillae are demonstrated covered by a single layer of endothelial cells. (Haematoxylin and eosin; original magnification  $\times 112$ .)

rarely an extravascular form, occurring in a haematoma. In Pins' review there were only four reports of papillary endothelial hyperplasia in an artery and none in a coronary artery.

The present patient could be classified as having a primary form of papillary endothelial hyperplasia but the vessel was not particularly dilated as is usual in this type. Histologically, the lesion was associated with thrombus but within it were multiple papillae containing fibrin cores covered by a single layer of endothelial cells. It might be confused with angiosarcoma but the papillae were more regular and endothelial cells lack mitoses in papillary endothelial hyperplasia.

For many years there was dispute about the primary pathology of this finding. Initially it was believed that the vessel endothelium underwent hyperplasia with secondary thrombus formation. Salyer and Salyer,<sup>3</sup> however, demonstrated foci of papillary endothelial hyperplasia in venous thrombi and arterial thromboemboli and suggested that the thrombus may be the primary event with secondary organisation leading to the formation of vascular channels lined by endothelium. The vascular channels, however, are disorderly and interspersed by endothelialised papillae rather than discrete as is found in recanalising thrombus. It is generally accepted that stasis and thrombosis are prerequisites for the development of papillary endothelial hyperplasia and both would have been present in our patient.

Several growth factors such as basic fibroblast growth factor and endothelial cell growth factor appear to regulate endothelial prolifera-

tion in normal vessels. Similar growth factors have been found in malignant tumours which are dependent on angiogenesis for their survival. Folkman and Klagsbrun<sup>4</sup> hypothesised that deregulation of normal physiological inhibitory pathways allows the uncontrolled endothelial proliferation that occurs in tumours and in other states of neovascularisation such as diabetic eye disease.

As early as 1876, it had been observed that vascularisation of the arterial intima was associated with overlying atheroma.<sup>5</sup> O'Brien *et al*<sup>6</sup> found that there was a significant association of endothelial cell replication with the presence of microvessels in atheromatous lesions removed by atherectomy. Interestingly there were no reports of papillary endothelial hyperplasia in any of the 201 atherectomy specimens they studied. As angiogenesis is growth factor dependent, these growth factors might also be responsible for the development of papillary endothelial hyperplasia in overlying thrombus. This theory was supported by Levere *et al*<sup>7</sup> who examined eight frozen section samples of intravascular papillary endothelial hyperplasia. They stained the samples using immunoreactive techniques for basic fibroblast growth factor and basic fibroblast growth factor protein and found a significant increase in these factors in thrombi containing papillary endothelial hyperplasia compared to those without. If these growth factors are also responsible for the intimal angiogenesis which accompanies atheroma it is surprising that papillary endothelial hyperplasia has not more frequently been reported in the thrombi overlying atheromatous plaques.

With the rapid growth of interventional techniques such as TEC and directional coronary atherectomy and the ability with these devices to remove intracoronary tissue, this unusual phenomenon may be increasingly recognised in arterial vessels.

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