



## Living history in current orthopaedic hip surgery : Intrapelvic teflon granuloma after total hip replacement

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**The teflon hip arthroplasty design was used by Sir John Charnley in the early 60's but was taken off the market due to high complication rates. A case is reported of an intrapelvic granuloma after total hip arthroplasty following the use of a teflon socket. This appears to be the last surviving patient treated by Sir John Charnley using a Teflon hip socket design.**

**Keywords :** teflon granuloma ; Charnley ; hip arthroplasty.

### INTRODUCTION

Teflon, or polytetrafluoroethylene (PTFE), is the polymer with the lowest coefficient of static and dynamic friction. These properties give it a wide range of uses not only in cookware and the building industry but also in medicine. It is known for the use in temporomandibular joint replacements, vocal cord injections, periurethral injections, neurosurgical dissection and microvascular decompression. Although it is supposedly inert and not resorbed in tissues, a side effect of polytetrafluoroethylene fibres or injection is a giant cell foreign-body reaction resulting in a teflon granuloma (6). These lesions can mimick malignancy but there has been no reported case of malignant transformation in humans (5,7,8).

Between the years of 1958 and 1962, Charnley developed a hip replacement consisting of a steel femoral component and a Teflon acetabular cup (1).

This hip replacement unfortunately had poor wear properties ; the sockets disintegrated, inducing a foreign body reaction. Most patients required early revision or conversion to Girdlestone arthroplasty.

### CASE REPORT

The case presented is a 75-year-old female patient, who recently presented to our new patient hip clinic. She underwent a left total hip replacement in 1960 under Sir John Charnley at Wrightington Hospital, when she was in her mid 20's. Within two years the hip replacement was revised to a Girdlestone arthroplasty and no further surgery was carried out on the left hip to date.

Radiological images in the form of plain radiographs and Magnetic Resonance Imaging (MRI) of the pelvis showed an intrapelvic lesion (fig 1 & 2). The MRI scan demonstrated a ring shaped structure within the large but shallow acetabular fossa. The

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**Fig. 1.** — Posteroanterior radiograph of the pelvis shows the left Girdlestone arthroplasty with the intrapelvic 'Teflon Granuloma' clearly visible medial to the acetabulum.



**Fig. 2.** — Coronal T1-weighted MRI demonstrates the granuloma displacing the pelvic contents.

lesion had the appearance of cellular material surrounded by a thick rim of calcification which was similar to the large mass along the pelvic side wall. These features were consistent with a walled off chronic teflon granuloma.

On examination the patient showed an osteoarthritic left knee and signs of a deteriorating right total knee replacement but was asymptomatic regarding the teflon granuloma.

After discussing the findings with her it was agreed that the granuloma would be left in place and no further surgical intervention was necessary to remove it.

In 1974, she underwent in Liverpool a right Charnley total hip replacement which has been successful, clinically and radiologically to date. She also underwent a right total knee replacement in 1984. Her clinical problems currently comprise an osteoarthritic left knee and a deteriorating right total knee replacement for which she is awaiting revision surgery.

## DISCUSSION

The teflon (polytetrafluoroethylene) hip socket was invented and produced by Sir John Charnley from 1958 to 1962, at Wrightington Hospital. Three hundred and thirty three patients between 1960 and 1962 underwent total hip replacement containing

the teflon socket. Charnley abandoned teflon in November 1962. He warned of serious mechanical and biological consequences such as caseation and sterile sinus formation (2,3).

The North American Travelling Fellows to Britain reported in 1965 how Sir John Charnley demonstrated the operative technique of total joint replacement and presented the results of low-friction arthroplasty using the teflon cup.

He was described as operating in a "greenhouse" using filtered air, to reduce the infection rate, which he stated was 0.5% per cent (4). Charnley was surprised to subsequently find that the Fellows reported that he was using teflon in arthroplasty of the hip joint, when they visited him in April 1965 (2).

He stated that he had evidently failed to warn of the major disadvantages of using teflon in hip arthroplasty, in particular the foreign body reaction to the particulate debris.

Charnley stated that he had shown the Fellows pathology specimens from cases demonstrating granulomas and caseous material (2).

The presented case here is the first documented in the field of orthopaedic surgery where such a "historical" lesion has been investigated using MRI

scanning. The history of the development of hip arthroplasty is a fascinating topic for study. It is littered with numerous examples of dead ends and blind alleys of which this is a particularly good example.

Once polyethylene was adopted for the manufacture of the acetabular component, 'the rest was history'.

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