Differences in Lesion Location Between Medial and Lateral Osteoarthritis of the Knee

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Introduction: The etiology and pathogenesis of osteoarthritis (OA) is expected to be different in the lateral and medial compartment of the knee due to the difference in the relative contribution of mechanical and constitutional factors. Radiological studies have shown that there is more anterior wear in medial knee OA and more posterior wear in lateral knee OA, reflecting the motion of the femoral condyles during flexion and extension[1]. Previous studies have looked at advanced disease where OA has developed in both compartments of the knee. The use of unicompartmental knee arthroplasty (UKA) has enabled direct visualisation of lesions in isolated uni-compartmental OA intra-operatively, giving a more accurate assessment at an early stage of disease. The main aim of this study was to analyse the site of full thickness lesions in medial and lateral OA, and to identify any specific wear patterns depending on the primary location of the disease.

Materials and Methods: The femoral and tibial joint surfaces of thirty-eight consecutive patients scheduled for UKA were inspected intra-operatively. None of the patients had clinical or radiological evidence of disease involving more than one compartment of the knee. The patients had either isolated medial OA of the knee (n=27) or isolated lateral OA of the knee. Intra-operative recordings of the locations of full thickness lesions in the femur and tibia were made, and the anterior, posterior, medial and lateral margins of the lesion were measured with reference to lines dividing the involved condyles into four quadrants. The midpoint of the lesions, antero-posteriorly and medio-laterally, were calculated and compared between the two groups. From the lateral radiographs, the relationship between the site of the lesions and the knee flexion angle was estimated.

Results: Femoral lesion: The mean midpoint of the lesions in patients with lateral OA was located 21.3 mm posterior to a transverse line passing through the inter-condylar notch (range 12 mm anteriorly to 60 mm posteriorly). This was located significantly posterior to that of the lesions in medial OA (p<0.001), which was located at a mean of 9.1 mm posterior to the reference line (range 20 mm anteriorly to 50 mm posteriorly).

The average midpoint of the lesions locations in medial OA occurred at the point on the femoral condyle normally in contact with the tibia at approximately 10 degrees of knee flexion. For lateral knee OA, the midpoint of the lesions were located on condyle in the area in contact with the tibia at 40 degrees of knee flexion.

Tibial lesion: The mean midpoint of the lesions in the tibial condyle was 2.7 mm posterior to the coronal mid-plane of the resected tibia in patients with lateral OA. This was located significantly posterior (p=0.03) to the midpoint for lesions for the medial OA cases, which was located at a mean of 2.5 mm anteriorly (range 12 mm anteriorly to 22 mm posteriorly).

Discussion: The difference in localisation of the full thickness lesions in different compartments of the knee suggests that medial and lateral OA of the knee have different etiology and pathogenesis. Medial OA appears to be a disease of extension with the lesion being maximum at 10 degrees of knee flexion, but for the lateral OA, the wear appears to occur at about 40 degrees of knee flexion.