Original Research

HIP FUSION IN YOUNG ADULTS

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ABSTRACT

Hip arthrodesis remains an option for treatment of severe arthritis in young persons resulting primarily from osteonecrosis, congenital dysplasia, and joint sepsis. The authors reviewed six patients who underwent fusions as young adults (average age: 30.8 years) with an average follow-up period of 11.7 years. Solid arthrodesis without infection was noted in all cases. Patients who worked returned to prior employment without limitation. All patients complained of symptomatic low back pain and felt ambulation was limited by ipsilateral knee pain. Five of six noted impaired sexual function; although childbearing was not affected in one case. Four of six were satisfied with the operation, but only three of six would undergo it again given the alternative of total joint arthroplasty.

The indications for hip arthrodesis have narrowed with the improved clinical results of total joint arthroplasty. Young adults with isolated unilateral hip disease primarily from avascular necrosis and adolescents with hip sepsis represent the major applications of this operation. There remains concern that total joint arthroplasty will continue to be problematic in the younger patient. Initial experience using older cemented techniques in patients under age 45 years revealed an early loosening rate at 5 years of 40% to 57%. However, results have significantly improved using modern cement techniques such as plugging and cement pressurization. More recently, cementless techniques have gained popularity in younger patients despite the growing concern of long-term osteolysis from particulate debris.

The satisfactory conversion of hip arthrodesis to total joint arthroplasty in several reports has been suggested as a reason to consider arthrodesis in young patients. However, Strathy points out the long-term higher failure rate noted in patients who have had operative arthrodesis compared to spontaneous post-sepsis ankylosis.

This article reviews the outcome and functional status in a small group of patients who had their hips fused as young adults and in whom total joint arthroplasty was offered but discouraged due to high failure rates. In particular, we wanted to know if our patients were satisfied with this operation considering the fact that total joint arthroplasty could have been considered in each case.

MATERIALS AND METHODS

Between October 25, 1963 and February 18, 1986, 16 patients had hip fusions at the Milwaukee County Medical Complex of which six patients were available for study. There were four women and two men, with an average age at fusion of 30.8 years (range: 18 to 44). The average age at follow up was 42.5 years (range: 29 to 72), with an average follow up of 11.7 years (range: 5.25 to 27.5).

The indications for fusion were posttraumatic arthritis in 2, congenital hip dysplasia in 2, avascular necrosis in 1, and tuberculosis in 1. Four had fusion performed with a Cobra plate. One patient required a second operation to correct for a pseudoarthrosis. No patient had documented or significant symptomatic pathology involving the contralateral hip, bilateral knees,

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or lower back. Each patient completed a five-page questionnaire pertaining to preoperative symptoms and employment as well as postoperative symptoms, employment, functional capacities, and limitations. The patients were also asked to rate their overall satisfaction with the procedure.14

Five of six patients were evaluated clinically. Each patient had a complete physical examination by the same examiner. Anteroposterior and lateral lumbar spine, anteroposterior pelvis, and standing bilateral knee radiographs were obtained and evaluated. The position and quality of fusion were noted radiographically and clinically. The results of the questionnaires were tabulated, and modified Harris hip and Hospital for Special Surgery scores were calculated. Points for stair climbing and limp were eliminated.15,16

RESULTS

All six patients had eventual fusion without evidence of infection. Four cases utilized a Cobra plate, one had a pin and dowel arthrodesis, and another a two-staged osteotomy with screw fixation. One case required a second operation for a pseudarthrosis. The average postoperative immobilization period was 16.3 weeks (range: 6 to 30). Four patients walked with a mild limp, and all had a leg length discrepancy averaging 3.4 cm (range: 1 cm to 6 cm). Two wore shoe lifts, one 4 cm in height and the other 6 cm. Two patients had limitations in lumbosacral motion in all planes, but only one was mildly painful, especially with extension. No patient had pain about the pelvis or sacroiliac joints.

Five patients had ipsilateral knee pain, but only 1 had mild laxity with varus stressing, and 2 had laxity with Lachman testing rated as 1+. The knee score for the ipsilateral knee averaged 80 (range: 61 to 95) and average knee flexion was 122°. Three patients had contralateral knee pain, but no patient exhibited any sign of ligamentous laxity. The knee score for the contralateral knee averaged 87 (range: 66 to 99) and average flexion was 133°. Only one patient had contralateral hip pain, but 2 had limitations in motion in all planes, especially with internal rotation. The Harris hip score was 86 (range: 46 to 100). No patient demonstrated radiacular signs or symptoms. However, 5 patients complained of pain about the fused hip, rated as mild in 3, moderate in 1, and severe in 1.

The position of fusion measured radiographically averaged 22° flexion (range: 20° to 33°), 1° adduction (range: 0° to 5°), and 6° external rotation (range: 0° to 15°). All patients had abundant fusion mass, and only one patient showed a fractured screw. One patient, age 72 at follow up, had evidence of degenerative changes in the contralateral hip, lumbosacral spine, and bilateral knees on radiographic analysis.

Of 4 patients employed preoperatively, all were able to return to work in a similar capacity postoperatively. At the time of follow up, 3 were employed; 1 had retired at age 65; and 1 had gone back to school. Two were employed at heavy manual labor, and no patient took a less demanding job as a result of the fusion. Four of 6 were involved in active recreational activities including softball, hiking, biking, racquetball, and dancing. Despite this, 4 considered themselves handicapped.

Ability to sit comfortably was unlimited in three, but was limited to under 2 hours in three. Standing was unlimited in one patient, while all other patients were limited to under 2 hours. Similarly, only one patient claimed unlimited walking ability, while four were limited to walking under 5 blocks. Only one patient used an aid for ambulation. All patients were able to dress themselves, and those who drove a car preoperatively did so after fusion.

Five of six patients noted some degree of sexual impairment, severe in one case. Two of the women delivered children after their hips were fused—one by vaginal delivery and another by Cesarean section. No complications were seen, and the decision to deliver by Cesarean section in one patient was not based on the fused hip.

All six patients were aware of the possibility of total hip arthroplasty preoperatively. At the time of follow up, 5 of 6 patients stated they would consider total hip arthroplasty given the risks and potential benefits. Two patients were very satisfied with the choice of fusion, 2 were satisfied, 1 was dissatisfied, and 1 was uncertain. Only 3 of 6 would definitely have a fusion at this time given the option of total hip arthroplasty. Two stated they would definitely not have a fusion at this time, and 1 was uncertain.

DISCUSSION

This report considers a small group of patients who underwent hip arthrodesis as young adults when alternative total joint arthroplasty was offered but discouraged due to potential high failure rates. Successful fusion was noted in all cases with no sepsis documented. One nonunion was satisfactorily treated with a second operation. This experience is comparable to a reported series where fusion occurred in 90% to 100% of cases.17 Some form of internal fixation combined with external immobilization continues to be the method of choice enabling high fusion rates.18,19 Cobra plates were utilized in four of six patients in this series.

The literature suggests the ideal position of fusion to be 20° to 30° flexion, 0°
abduction/adduction, and from 0° to 5° external rotation.\textsuperscript{18,19} The position of flexion was felt to be ideal in all of our cases, and ranged from 20° to 33°. Two patients had external rotation of greater than 10°, but this could not be correlated either with gait, functional score, or the occurrence of ipsilateral degenerative arthritis of the knee.

There were no physical findings referable to the lumbar spine, contralateral knee, pelvis, or ipsilateral knee in patients not noted to have intercurrent disease. This reflects the more limited follow-up times compared to the long-term studies of Callaghan et al,\textsuperscript{17} in which at least 66% and 70% of patients, respectively, were noted to have medial and lateral collateral ligament laxity. We were unable to identify radiographic changes involving the lumbar spine, pelvis, or ipsilateral knee in any patient, again reflecting the shorter follow up. Sprouse et al\textsuperscript{20} found frequent lumbar spine degenerative changes and asymptomatic narrowings of the sacroiliac joint space. Callaghan et al\textsuperscript{17} commonly noted joint space narrowing in the ipsilateral knee that was increased if the hip was fused in abduction. Sofue et al\textsuperscript{21} identified ipsilateral osteoarthritic knee changes in over 50% of patients fused longer than 15 years.

All patients in our study recognized significant symptomatic complaints involving the low back; however, no radicular symptoms were recognized. This would suggest a higher incidence compared to other studies, in which about 60% of patients noted mechanical low back symptoms.\textsuperscript{18,20} Also, low back and ipsilateral knee symptoms appeared to provide discomfort and significant limitations for the majority of our patients. We were unable to explain the persistent symptomatic pain about the arthrodesis despite solid radiographic union in five of six patients. Most previous reports describe virtual complete pain relief of the affected arthrodesed hip. It is possible these patients were experiencing referred lumbar pain.\textsuperscript{17,19,21}

We were impressed by the high rate of return to previous employment and functional activity. Two of our patients worked at jobs considered to be heavy manual labor successfully for at least 5 years. Recreational activity included biking, hiking, softball, dancing, and racquetball. On the other hand, four of six patients considered themselves handicapped.

We were concerned by the fact that five of six patients complained of mild to moderate difficulties with regard to sexual intercourse. Sponseller et al\textsuperscript{20} noted moderate difficulty with sexual mechanics in 38% of patients, but the average age of fusion in that series was 14 years. Vaginal delivery without difficulty was possible in one of our patients, and Callaghan et al\textsuperscript{17} described a similar case. Our findings suggest that preoperative counseling should consider the possibility of sexual dysfunction with each fusion candidate.

The opinions of our patients regarding overall satisfaction are not as optimistic, as reflected by other reports.\textsuperscript{19-21} Only two of six patients are very satisfied with their present situation; all of the patients would have considered total hip arthroplasty given the experience they have had with arthrodesis. Furthermore, only 50% of our patients would have considered this operation again.

Conversion of surgical hip arthrodesis to total joint arthroplasty has been suggested as a possible alternative for the disabled patient when late symptoms develop. However, recent reports have revealed extremely high failure rates when conversion arthroplasty was preceded by two or more operations. Strathy and Fitzgerald\textsuperscript{13} found a 48% arthroplasty failure rate on the 10-year follow up in patients with previous surgical arthrodesis and 67% in those patients with at least three prior operations. Kilgus et al\textsuperscript{16} stated that conversion arthroplasty failure was 11 times more likely in patients under 45 years old than in patients over 60 years.

Another option attempted for relief of pain in the lower back, ipsilateral knee, and contralateral hip has been arthroplasty of the ipsilateral knee and contralateral hip in hip fusion patients. Garvin et al,\textsuperscript{22} however, noted inferior results with this approach probably resulting from the increased stresses induced by the arthroplasty. Postoperative knee manipulations were necessary a total of 15 times in seven knees.

The unique aspect of studying this group of patients is that they are young, high demand individuals who functioned normally for a portion of their lives. None are afflicted with paralytic or multiple joint disease. Because the symptomatic and functional results of hip arthrodesis are not startling, it is likely that these patients will continue to demand a better solution. Great care should therefore be taken to select patients who should receive a hip arthrodesis.

REFERENCES


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who were less than 55 years old. J Bone Joint Surg. 1986; 68A:1430.

EDITORIAL DISCUSSION

ORTHOPEDICS: Is hip fusion the treatment of choice for mono-articular dysfunction in the second and third decade of life?

Barnhardt and Stiehl: In our opinion, hip fusion, despite the above noted problems, particularly with sexual dysfunction, remains the operation of choice in the second and third decades, but primarily for active men and in patients who are doomed to high failure rates because of the underlying hip abnormality, i.e., congenital dysplasia, sickle cell anemia, etc. We were impressed with the almost normal gait and high functional capacity for various sports in our male patients. On the other hand, women didn’t seem to like this operation. It would be a mistake to advise a woman that she will be able to have “normal” sexual intercourse, although childbirth does not seem to be an issue. We continue to recommend this operation; however, as borne out by this limited series, patients are quite aware, reasonable or not, of the benefits of total joint arthroplasty at an early age.

ORTHOPEDICS: Would there be less sexual dysfunction and less difficulty sitting if more flexion is incorporated into the fusion?

Barnhardt and Stiehl: Doubtfully, as our women could not get their legs apart, and this problem is not altered by flexing the hip. We would strongly advise against hip flexion of more than 30° for gait, as these patients are bound to have a significant limp.