The use of a hip score in assessing the results of treatment of proximal femoral fractures

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Summary. *An assessment of Salvati and Wilson's hip function rating system was performed after treatment in 207 proximal femoral fractures. The system had little correlation with pain and very poor correlation with change in mobility since injury. The use of composite scores should be abandoned in these circumstances.*

Résumé. *Les auteurs présentent une évaluation du système de Salvati et Wilson pour coter la fonction des hanches chez 207 patients après traitement des fractures de l'extrémité proximale du fémur. Le système de cotation s'est avéré n'avoir que peu de corrélation avec la douleur et une très faible corrélation avec l'évolution de la mobilité après le traitement. L'échelle de Salvati et Wilson ne paraît donc pas adaptée à ce type de pathologie.*

Introduction

A number of hip rating systems have been used to grade the results of treatment of proximal femoral fractures. Salvati and Wilson's scoring system was used at the Hospital for Special Surgery, New York, and originally described a series of patients, most of whom had been treated by hemi-

arthroplasty for arthritis of the hip [15]. It has since been reported in the assessment of the outcome following treatment of hip fractures with both arthroplasty [11, 14] and internal fixation [5, 6, 10].

Our study aimed to assess the accuracy of this system in a series of patients with hip fractures.

Table 1. Hospital for Special Surgery – hip rating system

Pain
0 = Constant and unbearable. Frequent strong analgesia
2 = Constant but bearable. Occasional strong analgesia
4 = Nil or little at rest. With activities
6 = Little pain at rest. Pain on activity
8 = Occasional slight pain
10 = No pain
Walking
0 = Bedridden
2 = Wheelchair
4 = Walking frame
6 = One stick, limited distances up to 400 yards
8 = One stick, long distances
10 = Unaided and unrestricted
Muscle power and motion
0 = Ankylosis with deformity
2 = Ankylosis with good functional position
4 = Poor muscle power. Flexion <60° abduction <10°
6 = Fair muscle power. Flexion 60–90° abduction 10–20°
8 = Good muscle power. Flexion >90° abduction >20°
10 = Normal muscle power. Full range of movement
Function
0 = Bedridden
2 = Housebound
4 = Limited housework
6 = Most housework, can shop freely
8 = Very little restriction
10 = Normal activities

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Grading of results
Score >31 = excellent, 24–31 = good, 16–23 = fair, <16 = poor

Table 2. Calculation of the mobility score

A. Is the patient able to get about the house?
B. Is the patient able to get out of the house?
C. Can the patient do their own shopping?
Able to without difficulty
Score 3
On their own, but with an aid
Score 2
Only with someone else's help
Score 1
Not at all. i.e., chair or housebound
Score 0
(Maximum score 9, minimum 0)

Table 3. Grading of pain

1. None
2. Occasional and slight
3. Pain when starting to walk, then becomes better. Occasional analgesia taken
4. None or little pain at rest, pain on activity. Mild analgesics taken frequently
5. Constant but bearable pain. Stronger analgesics occasionally needed
6. Constant severe unbearable pain. Frequent strong analgesics needed

Patients and methods

Two hundred and seven patients were seen on admission and one year after a fracture of the proximal femur using Salvati and Wilson's rating system (Table 1) [15]. The results were then correlated with the mobility before fracture, with changes in mobility over the year and pain in the hip at one year. Mobility was evaluated using the scoring shown in Table 2. Mobility before fracture referred to walking ability immediately before admission. Pain was graded as in Table 3.

Statistical evaluation of the results was performed using the Pearson correlation coefficient.

Results

The patients were divided into 4 groups by the scoring system: poor, fair, good and excellent. The average pain and mobility scores in the 4 groups is shown in Table 4.

These factors are listed in order of correlation using the Pearson correlation coefficient in Table 5. Complete correlation is 1 and no correlation is 0.

Discussion

The results show that the scoring system correlated well with mobility at one year from fracture, but there is little correlation with pain and very poor correlation with change in mobility. This is because the system assumes normal mobility before

Table 4. Relationship between category assigned by the grading system and pain, mobility and mobility change over the year since injury

Hip rating system	Poor	Fair	Good	Excellent
Number of patients	4	59	78	66
Average pain grade	3.0	2.5	2.2	1.6
Pre-fracture mobility	3.5	5.0	7.4	8.8
Post-fracture mobility	1.3	2.9	5.4	8.1
Average mobility change	2.2	2.1	2.0	0.7

Table 5. Correlation coefficients between rating system and outcome

Hip rating system: post-fracture mobility	= 0.82
Hip rating system: pre-fracture mobility	= 0.58
Hip rating system: average pain grade	= 0.35
Hip rating system: average mobility change	= 0.35

injury which is clearly not the case for patients with these fractures who frequently have limited mobility before their injury occurs.

For example, one patient walked with a Zimmer frame in the house before the fracture and had the same mobility with a painless hip after treatment. This patient would be graded as a fair result by the system, but the result was excellent.

A number of other grading systems have been described to assess outcome after hip operations, but they all allocate points to different aspects of function or residual symptoms and signs, and many subdivide the total score into 3 or 4 broad groups such as excellent, good, fair and poor. Judet and Judet were one of the first to suggest such an assessment [9] and this was modified by Stinchfield [17]. Other similar methods have been described [4, 7, 8, 12, 13, 16], but comparison shows wide variations in classification of outcome [1, 3].

Correction of the errors, which arise from presupposing normal function before treatment, can be attempted by using a system applied retrospectively and assuming full hip movements. This score would be subtracted from that made at the final assessment; such a method has been reported for hip fractures [11].

Our study indicated that numerical scoring is inappropriate for assessing results as there is no correlation between the final assessment and change in function since injury. We agree with Apley [2] that it is best to resist the simplicity of numerical scores and abandon the practice of adding unrelated scores. It would be more satisfactory to record the change in the individual aspects of function which have occurred since treatment.

References

1. Andersson G (1972) Hip assessment: a comparison of nine different methods. *J Bone Joint Surg [Br]* 54: 621–625
2. Apley AG (1990) An assessment of assessment. *J Bone Joint Surg [Br]* 72: 957–958
3. Callaghan JJ, Dysart SH, Savory CF, Hopkinson WJ (1990) Assessing the results of hip replacement: a comparison of five different rating systems. *J Bone Joint Surg [Br]* 72: 1008–1009
4. Charnley J (1972) The long-term results of low-friction arthroplasty of the hip performed as a primary intervention. *J Bone Joint Surg [Br]* 54: 61–76
5. Chiu KY, Pun WK, Luk KDK, Chow SP (1994) Cancellous screw fixation for subcapital femoral neck fractures. *J R Coll Surg Edinb* 39: 130–132
6. Cheng CL, Chow SP, Pun WK, Leong JCY (1989) Long-term results and complications of cement augmentation in the treatment of unstable trochanteric fractures. *Injury* 20: 134–138
7. Harris WH (1969) Traumatic arthritis of the hip after dislocation and acetabular fractures: treatment by mold arthroplasty. *J Bone Joint Surg [Am]* 51: 737–749
8. Johnston RC, Fitzgerald RH, Harris WH, Poss R, Müller ME, Sledge CB (1990) Clinical and radiographic evaluation of total hip replacement: a standard system of terminology for reporting results. *J Bone Joint Surg [Am]* 72: 161–168
9. Judet R, Judet J (1952) Technique and results with the acrylic femoral head prosthesis. *J Bone Joint Surg [Br]* 34: 173–180
10. Kofoed H, Alberts A (1980) Femoral neck fractures: 165 cases treated by multiple percutaneous pins. *Acta Orthop Scand* 51: 127–136
11. Kofoed H, Kofod J (1983) Moore prosthesis in the treatment of fresh femoral neck fractures: a critical review with special attention to secondary acetabular degeneration. *Injury* 14: 531–540
12. Larson CB (1963) Rating scale for hip disabilities. *Clin Orthop* 31: 85–93
13. Merle d'Aubigné R, Postel M (1954) Functional results of hip arthroplasty with acrylic prosthesis. *J Bone Joint Surg [Am]* 36: 451–475
14. Pun WK, Chow SP, IP FK, Chan KC, Leong JCY (1988) Long-term follow-up of Austin Moore hemiarthroplasty for femoral neck fractures. *J R Coll Surg Edinb* 33: 299–302
15. Salvati EA, Wilson PD (1973) Long-term results of femoral-head replacement. *J Bone Joint Surg [Am]* 55: 516–524
16. Shepherd MM (1954) Assessment of function after arthroplasty of the hip. *J Bone Joint Surg [Br]* 36: 354–363
17. Stinchfield FE, Cooperman B, Shea CE (1957) Replacement of the femoral head by Judet or Austin Moore prosthesis. *J Bone Joint Surg [Am]* 39: 1043–1058