The frequency, prognosis and significance of nerve injuries in total hip arthroplasty

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Summary. *Although the incidence of post-operative nerve palsy after total hip replacement is rare, it is an important complication for the patient. In a retrospective study the results of 2713 hip arthroplasties were reviewed. Sixty-one cases (2.24%) of post-operative neuropathy were identified, 13 of the sciatic nerve, 33 of the peroneal nerve and 15 of the femoral nerve. The risk is significantly higher in revisions (3.06%), especially when exchanging the acetabular component (8.5%) rather than in primary arthroplasties (2.13%). After an average period of 107 months (11–240) from operation, 41 patients with nerve lesions were questioned about their subjective functional capacity: 17% had recovered completely, 39% had noticed an improvement, and in 44% there was no change; 56.1% complained of weakness and had a complete paralysis. In all cases there was dysfunction of sensibility. Another 17.1% had a sensibility defect without weakness. There was pain in 51.2%, paraesthesia in 34.1% and areas of complete anaesthesia in 19.5%. Altogether 61% of the 41 patients had either gait problems or were dependent on orthotic devices. In summary, only about a third of the patients studied achieved a satisfactory degree of functional recovery.*

Résumé. *Bien que les lésions nerveuses soient assez rares après l'implantation de prothèses totales de la hanche, il s'agit d'une complication grave pour le patient. Dans une étude rétrospective, on a analysé les résultats de 2723 endoprothèses totales: il y avait 61 cas de neuropathie*

postopératoires, 13 cas concernaient le nerf sciatique, 33 cas le nerf sciatique poplité externe et 15 cas le nerf crural. Le risque augmente d'une manière plus significative en cas de révision (3,06%) – surtout en cas de changements isolés du cotyle (8,5%) – qu'en cas d'implantation de prothèses primaires. Après une durée moyenne de 107 mois (11–240), 41 patients ont été interrogés sur leurs pertes fonctionnelles actuelles: 17% parlaient d'une récupération complète, 39% d'une récupération partielle, et 44% d'une absence de récupération.

Introduction

Postoperative nerve lesions after hip arthroplasty are said to be a rare complication [3, 6] and are usually expected to recover spontaneously [13]. However, after hip replacement loss of function due to nerve damage is often in sharp contrast to the freedom from pain. In this study, the incidence, recovery and final disability associated with nerve lesions in a large group of patients is analysed. Our results are not only of interest to patients considering hip replacement, but also to those bearing the financial responsibility.

Method and material

Between 1974 and 1993, 2721 total hip replacements were performed in our department; 2394 were primary arthroplasties and 327 were revisions because of loose implants, with 16 isolated exchanges of the stem and 82 replacements of the cup.

Table 1. Review of the literature concerning the frequency of nerve lesions after total hip replacement and comparison with the present study

	n=	Postoperative nerve lesions as percentage of the cases			
		Total	Femoral nerve	Sciatic nerve	Peroneal nerve
Evarts et al. (1973)	200	3,0	1,5	1,0	0,5
Murray (1973)	808	1,9	0,4	0,1	1,4
Lazansky (1973)	501	1,4	0,2	0,6	0,6
Eftekhari et al. (1973)	700	1,2	0,0	0,0	1,2
Weber et al. (1976)	2012	0,7	0,2	0,4	0,0
Solheim and Hagen (1980)	825	0,7	0,2	0,6	0,0
Amstutz et al. (1982)	88	0	0,0	0,0	(Revisions) 7,5
Johanson et al. (1983)		0,6			
Edwards et al. (1987)	614	1,1			
Mok and Bryant (1989)	234			1,7	
Schmalzried et al. (1991)	3126	1,7	0,4	1,5	
Simmons et al. (1991)	440		2,3		
Own results	2723	2,2	0,6	0,5	1,2

The procedures were performed through the lateral approach of Watson-Jones or Bauer with the patient prone. An osteotomy of the greater trochanter was rarely performed. The acetabulum was exposed using Hohmann retractors positioned at the ventral and dorsal margins.

From a retrospective study of the charts, all cases of sciatic, femoral and peroneal palsies were noted. In addition the sex, age, type of operation (primary intervention, exchange of the prosthesis), duration of the procedure, blood loss and post-operative haematoma formation were recorded. The progress of the nerve palsies was carefully studied subjectively at interview.

Results

Sixty-one nerve lesions were found in 60 patients, an overall incidence of 2.24%. One patient who underwent simultaneous bilateral replacement sustained a lesion of the peroneal nerve on both sides. The sciatic nerve was affected in 13 cases, the peroneal in 33, and the femoral in 15; 58% of the lesions followed operations on the left side. The female to male ratio in those with palsies was 80 to 20%, and in the series as a whole 69 to 31%. There was no significant difference in age nor in the duration of the operation. The postoperative increase in leg length was slightly greater in the paralysed patients at 1.8 cm compared to 0.95 cm, and the hospital stay was also slightly longer, 38.7 days to 31.4 days. The risk of palsy was lower after the first operation (2.13%, $n = 51$), than after an exchange operation ($n = 10$) with 3.06% (Table 1). The high number of nerve lesions in cases of isolated exchange of the acetabular component was striking, 8.5% ($n = 7$), while for complete exchanges it was only 1.3% ($n = 3$). The incidence of

nerve lesions in the 852 male patients was only 1.41% compared with 2.57% in the 1861 females. Palsies delayed mobilisation after operation.

In 10% of palsied patients there was 4–5 cm increase in leg length. Lesions of the peroneal nerves may have resulted from the operative position; 12% followed exposure of the sciatic nerve. At the time of discharge, 52 (85%) were already improving in the estimation of the physician.

At the time of the study 11 (18.3%) of the 60 patients with nerve lesions had died, but in 2 the relatives were able to provide detailed information. Ten (16.6%) of the patients were not available. The remaining 39 survivors were interviewed at an average of 107 months (11 to 240) after the operation; of these 17% reported a complete recovery of function, 39% found the nerve dysfunction to have decreased, 44% estimated it to have remained unchanged, 56.1% complained of weakness, and 9% had a complete paralysis. All the cases also had sensibility defects with isolated dysaesthesia (17.1%), local pain (51.2%), paraesthesia (34.1%) and areas of complete anaesthesia (19.5%). Gait was restricted or dependent on orthoses in 61% of those interviewed; 9.8% used one crutch, 7.3% used 2 crutches, and 22.0% complained of severe restriction in walking.

Discussion

A lesion of a peripheral nerve following hip arthroplasty is not a rare occurrence (2.13%). It is probably more common than a deep infection. Table 1 shows that our figures are similar to those of other authors [1, 3, 4, 5, 6, 8, 9, 10, 12, 13, 14, 16]. This information is important to the patient, to

their physician, and to those responsible for the cost of the procedure. Patients may also find it difficult to understand what has occurred in these days of near perfection.

In an attempt to reduce the incidence of post-operative nerve palsy we have introduced the following measures:

1. Exact preoperative planning guided by radiographs and prosthesis templates in order to avoid undesirable leg lengthening.
2. A compromise between a biomechanically optimal position and excessive extension of the tissues in the presence of a high dysplastic acetabulum.
3. Careful positioning of the retractors around the acetabulum.
4. If there is no dorsal acetabular margin, usually in revision operations, an additional risk occurs as the sciatic nerve takes its course without osseous protection through the site of the operation. In these cases Hohmann or similar retractors should not be inserted as they use the remaining bone as an abutment and could expose the unprotected nerve to direct pressure. We now use a side position with the Watson-Jones or Bauer approach and retract the femur with a Langenbeck retractor.
5. If the femur can only be retracted with considerable force, usually because of scarring following previous operation, we favour osteotomy of the greater trochanter.
6. Examination of nerve function is performed on the day of operation and during daily ward rounds.

Intraoperative assessment of nerve function could prove interesting and useful [2, 7, 11, 15]. However, there are risks associated with all procedures, and complications can well prove expensive.

Several authors report good rate of recovery from these postoperative neuropathies [5, 16], but our study reveals a poor prognosis. Only one in three was satisfied with the return of nerve function. One reason for the different results could be the different patient populations. In our study, only clinically relevant lesions which had led to an obvious impairment were recorded in the case notes. Other reported series included lesions only revealed by technical means, and these slight defects probably have a significantly better prognosis. This view is supported by the results of Schmalzried et al. [12] who evaluated moderate

and severe neuropathies separately. All those patients who retained some motor function immediately after the operation or showed some return while in hospital had good results, but none of the patients with severe dysaesthesia in that study ($n = 5$) had a good recovery.

Our study only allowed us to investigate the subjective impairment of the patients, but even so the extent of recovery was disappointing with two-thirds of our affected patients remaining unsatisfied and suffering disability.

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