PARALYSIS OF THE PERONEAL NERVE FOLLOWING HIP FRACTURE TREATMENT

J. VERMEIREN[1], K. BRABANTS[2], M. VAN HOYE[2]

A prospective study was performed over a period of 2 years to identify the cause of peroneal palsy following hip fracture treatment. Sixty-eight patients in Group I had their injured leg placed in traction in a splint with a metal frame. In Group II (66 patients) elevation only of the fractured extremity was maintained with a few pillows. There were five cases of peroneal palsy in Group I and none in Group II. The difference is significant. Direct pressure on the nerve in the area of the fibular head during the preoperative traction period seems to be the cause of this transient dysfunction.

Keywords : paralysis ; peroneal nerve ; hip ; fracture.
Mots-clés : paralysie ; nerf sciatique poplité externe ; fracture ; hanche.

INTRODUCTION

Temporary dysfunction of the peroneal nerve after hip arthroplasty is well known. In our traumatology department the same observation following treatment of inter- and subtrochanteric fractures encouraged us to review the existing literature. As this enquiry was fruitless, we started a prospective study to look for the possible cause and the exact moment of occurrence of this nerve paralysis.

We considered four possibilities : it could appear at the time of the trauma itself, or during the transosseous wiring for preoperative traction ; thirdly it might occur during reduction of the fracture on the traction table or finally, it could appear postoperatively.

It soon became obvious that direct pressure to the peroneal nerve dorsal to the fibular head, with the leg externally rotated and resting on a metal frame, most probably caused the dysfunction. Hence, the preoperative traction method was altered during the second part of the study. From that moment on, peroneal palsy no longer occurred.

MATERIALS AND METHODS

From July 1987 to June 1989 all patients admitted with an intertrochanteric or subtrochanteric hip fracture to the emergency department of the Middelheim General Hospital in Antwerp were entered into the study.

All these patients underwent transtibial wire traction prior to internal fixation, which was usually performed within one or two days. The skeletal traction was always applied in the operating room by the assistant surgeon on duty.

During the first year of the study the injured leg was positioned in a splint, constructed around a metal frame, with 1 kg traction weight / 10 kg body weight (fig. 1). These patients form Group I.

During the second year we changed the positioning of the leg. Simple elevation of the foot of the hospital bed with two pillows under the injured leg was used instead of a metal frame (fig. 2). This was the only change in the regimen for Group II, compared to Group I.

The first group consisted of 68 patients (21 men and 47 women) and the type of fixation performed was chosen by one of the three surgeons in charge. The

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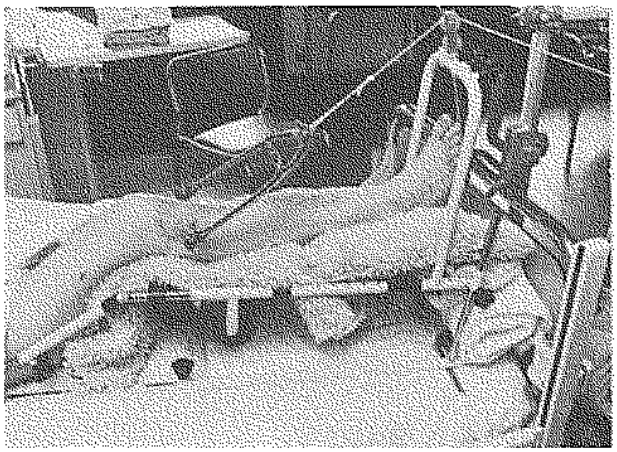

Fig. 1. — Positioning of the injured limb on the metal-framed atella in Group I.

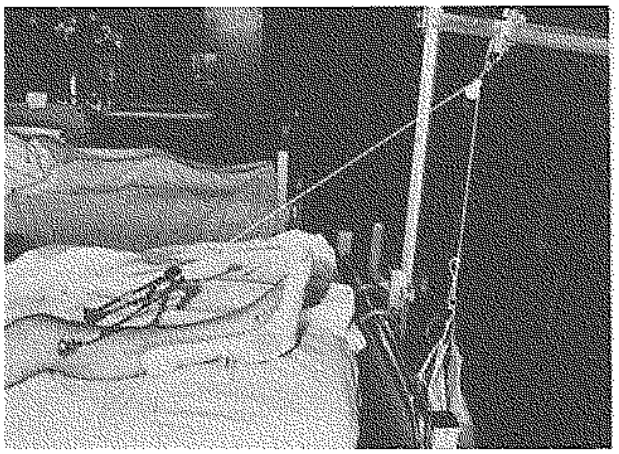

Fig. 2. — Positioning of the leg during traction in Group II.

procedures included 46 nail-plates or screw-plates, 16 sliding hip nails, 5 Ender nails and one cancellous screw fixation. The second group consisted of 66 patients (20 men and 46 women), 62 of whom had nail-plates or screw-plates and 4 sliding hip nails. The age distribution is shown in figure 3.

All patients were evaluated clinically on admission for peroneal nerve function. This was done by testing active dorsiflexion of the foot and big toe and sensibility in the first interdigital web. The same clinical test was performed before and immediately after anesthesia, on the first and on the eighth day after operation. When peroneal dysfunction was detected, an electromyograghic examination was performed and repeated after 6 weeks and 6 months.

RESULTS

We noted five cases of peroneal palsy in Group I. There were none in Group II. This is a significant difference according to calculations with Fisher's exact test ($p = 0.03$). All showed positive electromyographic signs of nerve compression at the 6-week postoperative examination. One paralysis was found in a patient whose fracture had been fixed with a sliding hip nail and four in patients whose fractures had been fixed with a screw-plate or nail-plate.

Follow-up investigation at 6 months and 2 years showed complete recovery of the peroneal nerve function in two patients. Two patients had died of causes unrelated to the operation (myocardial infarction and cerebrovascular injury), and one patient could no longer be examined owing to senile deterioration.

DISCUSSION

Peroneal palsy following surgical treatment of inter- and subtrochanteric fractures is a rare but serious complication. It often takes several months for the nerve to recover its motor function. Since hip fractures often occur in elderly patients, drop-foot is a real burden during their rehabilitation period. To our knowledge no studies have been published on this subject.

Several authors have reported neuropathies after total hip replacement (1, 4, 8, 10, 11). An incidence of around 1% after primary arthroplasty and about 3% after revision surgery can be agreed upon. Prognosis is generally good. Engelhardt *et al.* (2) encountered 2.4% nerve lesions in a retrospectively studied group of 253 knee-joint replacements. In these cases however, adequate surgical therapy can lead to a satisfactory outcome (6). Tibial osteotomy in the knee region can lead to the same complications (5). Other causes of traumatic peroneal nerve injury, including traction in severe knee trauma (7, 12), blunt or sharp direct lesions or postoperative hematoma in patients on anticoagulants after hip surgery (9), have all been described but are of little significance with respect to our problem.

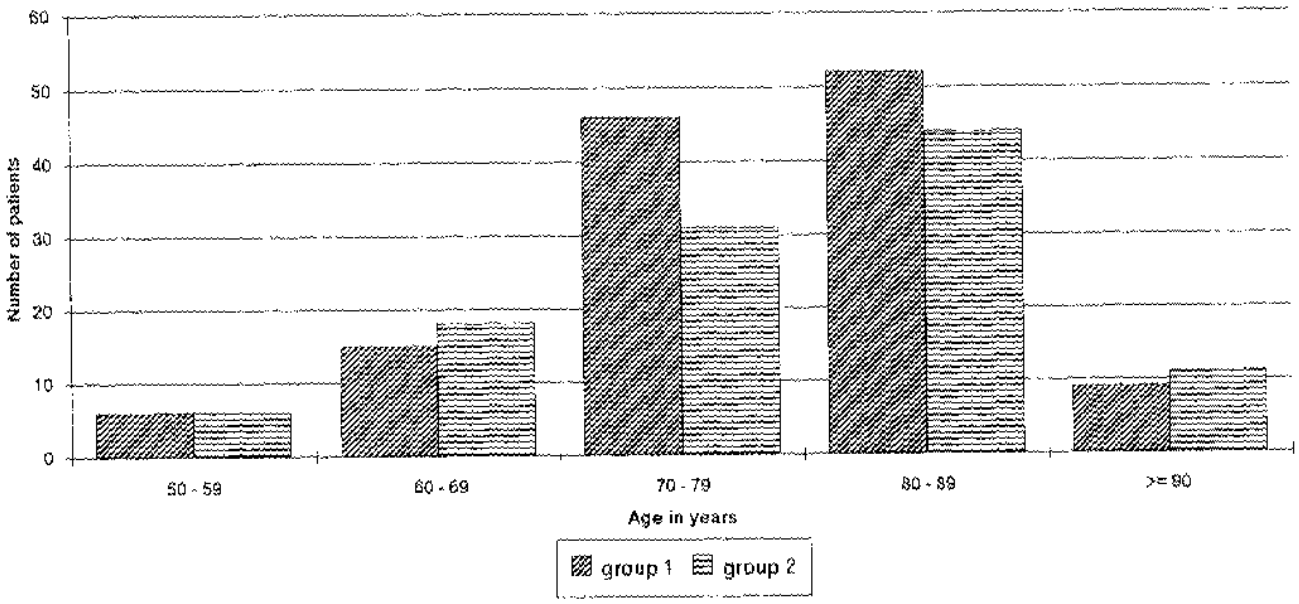

Fig. 3. — Distribution of the patients according to age.

Since the only significant change in treatment between groups I and II was changing the position of the leg during preoperative traction, we conclude that the possible cause for the observed peroneal paralysis was the direct pressure of the metal frame on the fibular neck (fig. 4).

The external rotation of the affected leg due to the hip fracture persists in spite of the transosseous wire traction. Together with the patient's poor general health this will result in high local pressure on the peroneal nerve. Antalgic immobilization enhances this condition.

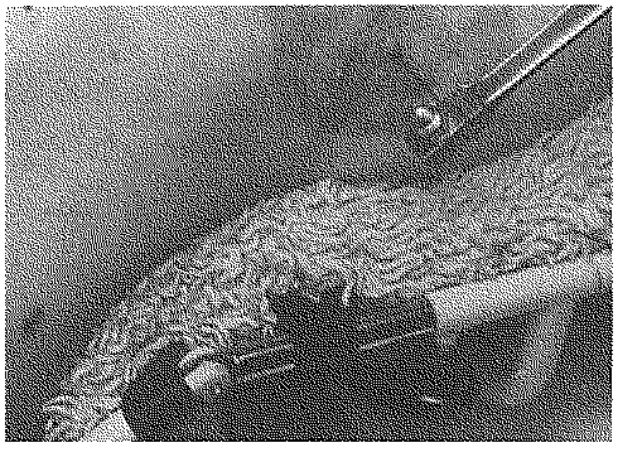

Fig. 4. — Detail of the dangerous zone around the fibular head during traction in Group I.

Is preoperative traction necessary in the treatment of hip fractures in the elderly? Finsen *et al.* (3) did not find any significant advantage of preoperative traction. Their prospective study comparing no traction, skin traction and skeletal traction before hip fracture treatment presented arguments in favor of no traction at all. Still, we believe in the analgesic effect of early immobilization. Hence, in our trauma department only nondisplaced or stable subcapital fractures are now treated without traction.

Once our prospective study had been completed, transosseous wiring was changed to adhesive skintape traction. The leg elevation with pillows remained the same. Until today this method has provided good pain relief, and no further peroneal dysfunction has been observed.

We were not able to study the long-term evolution of these peroneal neuropathies, because only two patients could be properly followed, owing to poor health and old age.

We conclude that the positioning of a lower limb under continuous traction and especially the avoidance of direct pressure on the fibular head is of utmost importance to prevent peroneal nerve paralysis. Therefore we do not recommend the use of a metal-framed splint during the preoperative traction period.

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SAMENVATTING

J. VERMEIREN, K. BRABANTS, M. VAN HOYE. Paralyse van de nervus fibularis na behandeling van heupfrakturen.

Gedurende twee jaar werd een studie verricht om de directe oorzaak te bepalen van tijdelijke verlamming van de nervus fibularis na de behandeling van heupfracturen. In Groep I werden 68 patiënten preoperatief behandeld met transtibiale snaartractie waarbij het been op een slede met metalen frame werd gelegd. In Groep II werd deze atella vervangen door enkele kussens. Er werden vijf gevallen van nervus fibularisverlamming gezien in de eerste groep en geen enkele in de tweede. Dit is een significant verschil. Rechtstreekse druk op de zenuw in het gebied van het caput fibulae lijkt de meest waarschijnlijke oorzaak van deze voorbijgaande complicatie.

RÉSUMÉ

J. VERMEIREN, K. BRABANTS, M. VAN HOYE. Paralysie du sciatique poplité externe après traitement des fractures de hanche.

Les auteurs ont surveillé pendant une période de deux ans la survenue de lésions du nerf sciatique poplité externe chez des patients traités pour fracture de hanche. Dans un premier groupe, 68 patients avaient subi l'ostéosynthèse de leur fracture après installation du membre en traction continue sur une attelle pourvue d'un cadre métallique ; 5 paralysies sciatiques sont survenues dans ce groupe. Cette attelle a été abandonnée et, chez les 66 patients du groupe II, l'élévation du membre a été obtenue en surélevant le pied du lit et en glissant des coussins sous le membre fracturé ; aucune paralysie du nerf sciatique poplité externe n'a été notée dans ce groupe. La différence est significative. La cause de cette atteinte nerveuse semble être la compression du tronc nerveux au niveau du col du péroné au cours de la période de traction préopératoire ; les auteurs recommandent l'abandon des attelles de traction à cadre métallique.