IS PREOPERATIVE TIBIAL TRACTION RESPONSIBLE FOR PERONEAL NERVE PALSY IN PATIENTS WITH A FRACTURED HIP ?

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A study of 456 cervical hip fractures treated with internal fixation was performed to evaluate the incidence of paralysis of the peroneal nerve following hip-fracture treatment. There were no cases of peroneal nerve paralysis in a group of 206 patient treated with a dynamic hip screw without preoperative traction. There were 2 cases of peroneal nerve paralysis in a group of 250 patients treated with 3 parallel screws with preoperative skeletal traction via a tibia pin. This difference was not significant according to Fischer's test (two-tailed P value = 0.5036). We conclude that the incidence of paralysis of the peroneal nerve following hip-fracture treatment is low although preoperative skeletal traction with the injured leg positioned in a Böhler-Braun splint may contribute to this complication.

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

INTRODUCTION

A very high rate of 7% peroneal nerve palsy following hip-fracture treatment with preoperative tibial traction with the injured leg placed in a Böhler-Braun type of splint was reported by Vermeiren *et al.* in 1995 (17). They concluded that direct pressure of the metal Böhler frame on the nerve during preoperative traction was the cause, and not the fracture fixation or the preoperative traction itself. However this was not our clinical experience, and although several authors have reported an incidence of neuropathies around 1% after primary total hip replacement (2, 4, 14, 15, 18), the literature on paralysis of the peroneal nerve following osteosynthesis of hip fracture is scanty (3, 17). The purpose of this study was therefore to evaluate the incidence of paralysis of the peroneal nerve following internal fixation of hip fractures with and without preoperative traction.

PATIENTS AND METHODS

During a period of 4 years (January 1990-December 1993) 206 fractures of the neck of the femur (163 in women and 43 in men) were treated at Frederiksberg University Hospital with a dynamic hip screw. Preoperative traction was never used. The median age was 80 years (range 50 to 98 years). According to Garden's classification, 98 fractures were of type 1 + 2 and 108 fractures were of type 3 + 4. During the same period 250 fractures of the neck of the femur (189 in women and 61 in men) were treated at the Rigshospitalet with 3 parallel screws. Preoperative skeletal traction via a tibial Steinman pin was used in all cases, and the injured leg was positioned in a Böhler-Braun frame. The Steinman pin was passed through the proximal tibia under local anesthesia in the emergency room and a 4-to-6 kg traction weight was applied. The median age was 79 years (range 51 to 100 years). According to Garden's classification, 154 fractures were of type 1 + 2 and 96 fractures were of type 3 + 4. The standard

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perioperative prophylactic antibiotic was 1 g flucloxacillin intravenously. Horizontal laminar air flow through the operating room was used. Routine prophylactic anticoagulation was achieved with Innohep (Tinzaparin) 3500 IU per day and graduated pressure elastic stockings (TED). The dynamic hip screw used was Dual-Biomet. The 3 parallel screws used were Ullevaal-Howmedica. As a rule the operation was performed as soon as possible after admission. The delay between the time of admission and the time of surgery was recorded. Physical therapy began the day after the operation, and the patients were mobilized fully weight-bearing if possible. The average follow-up time was 2.5 years (range 1 to 5 years).

RESULTS

A total of 456 cervical hip fractures was operated.

Group without traction

There were no cases of peroneal nerve paralysis. The mean duration of the interval between admission and operation was 26 hours. The failure rate for fractures treated with a dynamic hip screw was $14/98 = 14\%$ for Garden 1 + 2 fractures and $43/108 = 40\%$ for Garden 3 + 4 fractures.

Group with traction

There were 2 cases ($2/250 = 0.8\%$) of peroneal nerve paralysis. The mean duration of the interval between admission and operation was 33 hours. The peroneal nerve paralysis was permanent in both cases. The failure rate for fractures treated with 3 parallel screws was: $23/154 = 15\%$ for Garden 1 + 2 fractures and $38/96 = 40\%$ for Garden 3 + 4 fractures. The difference in the incidence of nerve palsy was not significant according to Fischer's test (two-tailed p value $= 0.5036$). However this may result from the low incidence in our series.

DISCUSSION

It has been customary in many countries to place patients awaiting operation for femoral neck fractures in skeletal or skin traction (3, 12, 16). The value of preoperative traction however is debatable (13). It may reduce pain through immobilization and yet at the same time it may partly reduce the fracture, and thus make the operation easier to perform. However in the only randomized trial available, Finsen *et al.* (3) compared skin traction, skeletal traction and no traction with the leg placed on a pillow in the bed. There was no indication that traction conferred any benefit compared with no traction in terms of the requirement for analgesia. On the contrary there was a trend for those in skeletal traction to receive more pain medication. Furthermore fracture reduction was significanlty quicker in the no-traction group and intraoperative bleeding was somewhat higher in the skeletal traction group. Traction may also have a detrimental effect in intracapsular fractures as maintaining the hip in extension may increase intracapsular pressures with resultant reduction of blood flow to the femoral head (13). In a randomized trial to determine the effect of skin traction on patients awaiting surgery for fractures of the proximal femur, Anderson *et al.* (1) allocated 252 patients to be nursed free in bed or to receive Hamilton-Russel skin traction. No differences were found between the groups in terms of pain suffered, analgesia required, frequency of pressure sores or ease of operation. They concluded that the application of skin traction for patients with fractures of the upper femur is time-consuming, and the overall cost is considerable. They therefore recommend that routine use should be discontinued. There are potential dangers to the use of skin traction, but they found no patients who suffered direct skin damage as a result of the application of traction. An incidence of neuropathy of about 0.3% to 2% after primary arthroplasty and about 3% after revision surgery has been reported (2, 4, 14, 15, 18); however this may be irrelevant as the pathogenesis is probably different. Our incidence of neuropathy was similar and much lower than the 7% reported by Vermeiren *et al.*, although our study may seem to confirm that a Böhler-Braun type of metal framed splint is best avoided. They concluded that direct pressure of the metal Böhler frame on the nerve during preoperative traction was the cause, and not the fracture fixation or the preoperative traction itself.

Therefore they do not recommend the use of a metal-framed splint during the preoperative traction period. We do not have any explanation for the difference in the incidence of palsies in our series (2/250) as opposed to 7% in Vermeiren's series, both using a Böhler frame. However, our series was retrospective, and we may have failed to notice cases with minor symptoms. Other factors may include differences in delay between admission and operation. Although a different device for internal fixation was used in our two groups there was no suggestion that preoperative traction had any effect on fracture failure rates. However reoperations after osteosynthesis of femoral neck fractures are frequent, occurring in about 30% of cases (19). Also the 3-month mortality rate, the blood transfusion requirement and the superficial and deep wound infection rate seem to depend on the type of operation carried out (5, 6, 7). Our failure rate following internal fixation of Garden 1 + 2 and Garden 3 + 4 femoral neck fractures was comparable to that in other series (8). Optimizing a single method of internal fixation with particular attention to screw position and bone density may prove more beneficial than changing the method of internal fixation altogether (9, 10, 11).

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SAMENVATTING

N. LEVI. Is preoperatieve transtibiale tractie verantwoordelijk voor de n. fibularis paralyse bij patiënten met eenheup fractuur ?

De incidentie van n. fibularis paralyse bij 456 heupfracturen werd nagekeken.
Geen enkele paralyse werd vastgesteld bij de 206 patiënten behandeld met een dynamische heupschroef zonder voorafgaande transtibiale tractie. Bij de 250 patiënten behandeld met parallelle schroeven en voorafgaande transtibiale tractie werden 3 gevallen vastgesteld. Dit verschil is niet significant (Fischer test, $p = 0,5$). De incidentie van fibularis paralyse is laag, doch eventueel kan tractie en positionering op een Braun attelle bijdragen tot deze complicatie.

RÉSUMÉ

N. LEVI. La traction pré-opératoire sur broche tibiale est-elle responsable des paralysies du sciatique poplité externe après fracture du col fémoral ?

L'auteur a passé en revue les dossiers de 456 fractures du col fémoral traitées par ostéosynthèse, pour apprécier l'incidence des paralysies du sciatique poplité externe (SPE) qui ont compliqué ce traitement. Il n'y avait aucun cas de paralysie du SPE dans un groupe de 206 patients traités par vis-plaque dynamique, sans traction préopératoire. Il y avait deux cas de paralysie du SPE dans un groupe de 250 patients traités par vissage avec trois vis parallèles, après traction préopératoire sur une broche tibiale. Cette différence n'était pas significative d'après le test de Fischer ($p = 0,5036$). L'auteur conclut que l'incidence de la paralysie du SPE après ostéosynthèse d'une fracture du col fémoral est faible ; une traction osseuse pré-opératoire avec le membre positionné sur une attelle de Böhler-Braun peut cependant favoriser la survenue de cette complication.