



## The evaluation of fitness and quality of life after palliative fixation of fractures caused by neoplastic metastases to the bones

<sup>1</sup>Błażej Ciesielczyk, <sup>2</sup>Dawid P. Murawa, <sup>1</sup>Piotr Dzieciuchowicz

<sup>1</sup>Surgery Department, F. Raszeja Hospital in Poznań, ul. Mickiewicza 1, 60-833 Poznań, <sup>2</sup><sup>1st</sup> Oncological Surgery Department, Great Poland Cancer Centre, ul. Garbary 15, 61-866 Poznań

Rep Pract Oncol Radiother 2004;9:109-12, original paper

Received April 1<sup>st</sup>, 2004; received in a revised form June 6<sup>th</sup>, 2004; accepted June 23<sup>rd</sup>, 2004

### Summary

**Background:** Pathological fractures in the last phase of a neoplastic disease impair fitness and cause additional physical and mental suffering. Only surgical treatment ensures stabilization of a broken bone and thus lessens the pain and restores the function of the limb. The aim of this study is to evaluate fitness and quality of life after intramedullary fixation stabilizing of pathological fractures.

**Material and methods:** 12 patients (8 femoral shaft fractures, 2 pertrochanteric fractures, 2 tibial shaft fractures) were treated with this method. In all patients a disseminated neoplastic disease was diagnosed. In 10 patients closed intramedullary fixation with a Kuntscher nail was performed (in 7 patients it was locked in a dynamic manner), in two patients fixation was made with Ender nails. Fitness was evaluated according to the ability to move, to load the operated limb, the range of motion in adjacent joints and muscle atrophy. One month after the operation quality of life was evaluated according to: the ability of self care, self dependence, subjective feeling of pain, necessity of analgesic intake and psychosomatic state.

**Results:** Three patients achieved preoperative fitness, despite worsened of fitness 6 patients were able to function independently and three patients required continuous care. All patients had to take analgesics, relief in severe pain typical of fracture was observed, but chronic pain typical of metastases was still present. The patients died within 2 to 16 months after the operation.

**Conclusions:** Palliative intramedullary bone fixation in the last phase of a neoplastic disease makes possible stabilization of pathological fractures and is sufficient for the patient to function independently.

**Key words:** metastatic disease, locked nailing, pathological fractures.

## Ocena sprawności i jakości życia po paliatywnym zespoleniu złamań z powodu przerzutów nowotworowych do kości

### Streszczenie

**Wstęp:** Złamania patologiczne w okresie terminalnym choroby nowotworowej upośledzają sprawność i powodują dodatkowe cierpienia fizyczne i psychiczne. Tylko leczenie operacyjne zapewnia stabilizację złamanej kości, a tym samym zmniejszenie bólu i przywrócenie funkcji kończyny. Celem pracy jest ocena sprawności i jakości życia po zespoleniu śródszpikowym stabilizującym złamanie patologiczne.

**Materiał i metoda:** Tym sposobem leczono 12 chorych (8 - złamania trzonu kości udowej, 2 - złamania przezkątarsowe, 2 - złamania trzonu kości piszczelowej). U wszystkich chorych stwierdzono rozsianą chorobę nowotworową. U 10 chorych zastosowano zamknięte zespolenie śródszpikowe gwoździem Kuntschera (w tym u 7 ryglowane sposobem dynamicznym), u 2 chorych zespolenie gwoździami Endera. Oceniono sprawność uwzględniając: zdolność poruszania się, obciążanie operowanej kończyny, zakres ruchów w sąsiednich stawach, zaniki mięśniowe. W miesiąc po operacji badano jakość życia oceniając: samodzielność, samoobsługę, subiektywną ocenę bólu, konieczność przyjmowania leków przeciwbólowych oraz stan psychosomatyczny.

**Wyniki:** 3 chorych osiągnęło sprawność sprzed złamania, 6 pacjentów mimo pogorszenia sprawności było zdolnych do samodzielnego funkcjonowania, 3 chorych wymagało ciągłej opieki. Wszyscy chorzy musieli otrzymywać leki przeciwbólowe, obserwowano ustąpienie ostrych dolegliwości typowych dla złamania, natomiast utrzymywały się przewlekłe bóle charakterystyczne dla obecności przerzutów. Chorzy zmarli w 2 do 16 miesięcy od operacji.

**Wnioski:** Paliatywne zespolenie śródszpikowe w okresie schyłkowym choroby nowotworowej pozwala ustabilizować złamania patologiczne w sposób wystarczający dla samodzielnego funkcjonowania.

**Słowa kluczowe:** przerzuty nowotworowe, gwoździowanie śródszpikowe, złamania patologiczne.

## Introduction

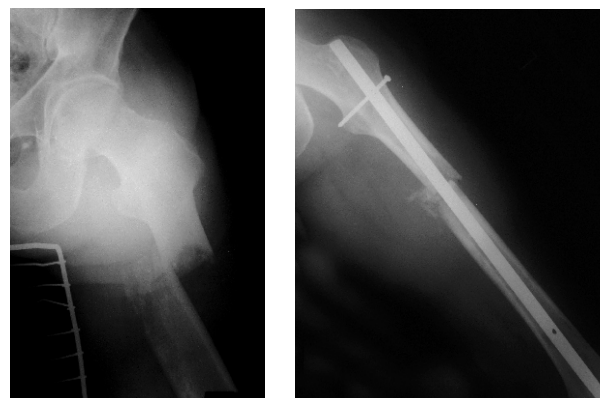
Prolonging survival rate of patients with generalized neoplastic diseases by advances in chemo-, radio-, hormono-, and immunotherapy has caused an increase in the number of patients suffering neoplastic metastases into the bones (nmb) as well as in the number of threatening or real pathological fractures (pf) [1,2].

The purpose of treating pf in the terminal stage of a neoplastic disease is to restore the function of the patients extremity and to relieve pain. The success of a surgical procedure is measured not so much by the patient's survival, but by the improvement in their quality of life, i.e. regaining of independence and daily self-service abilities, and relieving pain. In the terminal stage, a palliative procedure is to facilitate a bed stricker patient's nursing. The management of nmb requires the cooperation of oncologists and surgeons. Frequently asked questions are: should a metastasis be resected followed by radio- or chemotherapy? Should treatment be limited to fracture stabilization only? Or, because of neoplasm dissemination, should we only immobilize the extremity? These questions find no answers as management standards are not as yet available. Still, the opinion becomes more and more commonly accepted that despite the disease being branded as incurable, it requires surgical treatment. It has become a standard procedure to qualify those patients whose prognosis more than 3 month's survival [1,2,3,4]. Most authors emphasize patient's prognosis as to survival to be difficult [5, 6], therefore, even at the terminal stage of the disease, surgical operations are considered justified, mainly those which are burdensome least for the patient and ensure fast restoration of the limbs function, such as a close locked intramedullary osteosynthesis [7,8].

The aim of this paper is to evaluate functioning skills and quality of life following the application of intramedullary osteosynthesis stabilizing pathological fractures.

## Material and methods

In the years 1986-2003 twelve patients were admitted to the Surgery Department of Fr. Raszeja Hospital in Poznań with the diagnosis of pf due to nmb. Their age ranged between 45 and 78 years. Eight patients had undergone femoral bone shaft fracture, two had transtrochanteric femoral fracture and two had tibial bone shaft fracture. Fractures were located at the sites of osteolytic metastases of neoplasms from internal organs (in 6 cases from the lung, in 4 cases from the breast, in two cases from the kidney). Ten intramedullary osteosynthesis were performed using Kuntscher's pins (Figure 1) and two syntheses of transtrochanteric fractures using Ender's pin bundles. Bone chips were collected from 10 patients while drilling a medullary canal for histopathological evaluation to confirm the neoplastic character of osteolysis. The operation techniques and the results have been reported elsewhere [9]. One month after the operation daily skills and the quality of life were assessed according to the scale designed by the au-



**Figure 1.** Patient R.B. aged 45 years operated on due to a broken femoral bone caused by a metastasis of lung cancer, closed intramedullary fixation with dynamic bolting.

**Table 1.** Evaluation of fitness and quality of life after palliative fixation of fractures caused by neoplastic metastases to the bones.

Ability to move	Strength of the limb	The range of motion in the adjacent joints	Muscles atrophy	Self care Independence	Pain	Satisfaction after operation	Points
move individually	full	full	absent	full	little typical for neoplasm	full	1
using a wheel chair	party	partly active motion	small only the fractured limb	partly need help	big typical for fracture needs medication	partly	2
lie	no strength	none or passive motion	big general	need 24 h care	narcotic base pain killers need to be applied	negative opinion of treatment	3

thors themselves and listed in *Table 1*. Scores 7-9 were considered a good result of both, functional skills and life quality; scores 10-13 were regarded satisfactory, enabling limited patient's independence and scores 14-21 showed a poor result. The evaluation was repeated after 6 months.

## Results

All patients assumed erected position on day 2-6 following the operation and strained the operated extremity.

Three patients regained pre-fracture functional skills, walked unattended and did not require assistance. These patients showed full acceptance of the operation, having been informed as to the diagnosis and prognosis. In 6 patients deterioration of skills was noted, they walked unattended or used elbow crutches, but the strain caused pain requiring permanent drug application. Their independence became limited and they needed assistance in daily functioning, but still showed full or partial satisfaction of the operation results. Three patients required round-the-clock assistance despite their ability to move around using crutches or a two-hand walking support, the so-called "balcony". In all patients acute pains typical of fractures subsided, however chronic pains associated with metastases persisted. Gradual shortening of the relevant extremity was noted due to a telescopic effect which did not affect walking skills or life quality. A repeat examination after 6 months was made on all surviving patients (7 people). Worsening of skill was not noted, and a change in life quality was associated with the progress of the neoplastic disease. No cracks in metallic connectors were found although there was no union present. All patients died from neoplastic cachexia in 2 to 16 months following the operation. When observed, the patients did not develop any pathological fracture of other bones.

## Discussion

The ECOG (Eastern Cooperative Oncology Group) scale proposed by Darmon et al. [10] to evaluate treatment results does not incorporate the aspects of tolerance to pain and self-service skills, on the other hand Dutka's et al. scale [11] did not consider the degree of patient's satisfaction. Therefore we have introduced our own scale taking into account all results of palliative treatment and making possible the evaluation of life quality after surgical treatment of pf. In a systemic neoplastic disease removal of a metastasis to the bone does not affect prognosis [12]. What counts to the patient is keeping their limb functional and improving his or her life quality [11]. Moreover, the severity of operation is of significance as well as fast rehabilitation, ability to strain the limb early and the length of hospital stay. Expected patient's survival time cannot be shorter than that needed for a post-operation convalescence. Therefore intramedullary synthesis which enables immediate rehabilitation

and fast return home is especially useful in pf. A patient with a disseminated neoplastic disease has no time for a prolonged orthopedic therapy.

In pf due to nmb we cannot obtain bone union. Consequently, the material used for the procedure should be of high durability enabling limb strain without bony union. This condition is well satisfied by an intramedullary pin. Its central, intraosseous location makes bending and breaking forces rarely destabilize the synthesis. No pin crack was observed. The application of a lock is of utmost importance to prevent rotation on a pin. The methods of effective locking considering the osteolytic nature of the majority of nmb has been described in a separate report [9]. We suggest that in the case of fractures affecting proximal epiphysis of the femur, the synthesis according to Ender, which we were applying, may be substituted for by the synthesis using Gamm's or Zicke's pin, especially in patients with neoplastic dissemination where metastasis resection or prosthesis implantation is not planned. In our material pf due to neoplastic metastases to the humerus were not observed. Wasilewski et al. report high efficacy of locked intramedullary osteosynthesis in such fractures [13]. A question might be asked if we should implant an intramedullary pin in case of a threatening pf of a bone damaged by a neoplastic metastasis. Basing on the research by Beals, Hipp and Keene [14,15,16] we consider radiological assessment of the bone damage extent as not being effective to precisely foresee the risk fracture, and drilling into the medullary cavity may lead to further neoplasm dissemination. However, there are reports on a high analgesic effect brought about by an intramedullary osteosynthesis in threatening fractures [14,17,18]. The issue requires further prospective research involving larger number of patients.

## Conclusions

Palliative intramedullary osteosynthesis at the terminal stage of a neoplastic disease enables pathological fracture stabilization to a degree that allows the patient to lead a self supporting life.

## References

1. Aaron AD. Treatment of metastatic adenocarcinoma of the pelvis and the extremities. *J Bone Joint Surg* 1997;79:917-32.
2. Harrington KD. Orthopedic management of extremity and pelvic lesions. *Clin Orthop* 1995;312:136-47.
3. Algan SM, Horowitz SH. Surgical treatment of pathologic lesions in patients with metastatic disease. *Clin Orthop* 1996;332:223-31.
4. Capanna R, Campanacci DA. The treatment of metastases in the appendicular skeleton. *J Bone Joint Surg* 2001;83B:471-81.
5. Dutka J, Sosin P, Urban M. Skuteczność leczenia operacyjnego złamań patologicznych na tle przerzutów nowotworowych do kości w aspekcie czasu i komfortu przeżycia. *Chir Narz Ruchu Ortop Pol* 2000;65:643-9.

6. Karwicki L, Kmieciak M, Słomczykowski M. Postępowanie w przerzutowych guzach kości w warunkach miejskiego oddziału ortopedyczno-urazowego. *Chir Narz Ruchu Ortop Pol* 1996;61 suppl 4a:293-7.
7. Assol M, Zanone X, Peter RE. Osteosynthesis of metastatic lesions of the proximal femur with a solid femoral nail and interlocking spiral blade inserted without reaming. *J Orthop Trauma* 2000;14:394-7.
8. Favorito P, Mc Grath B. Impending or completed pathologic femur fractures treated with intramedullary hip screws. *Orthopedics* 2001;24:359-63.
9. Ciesielczyk B. Paliatywne śródszpikowe unieruchomienie złamań patologicznych w okresie terminalnym choroby nowotworowej. *Ortop TraumReh* 2003;5:331-4.
10. Darmo TA, Sim FH. Operative treatment for metastatic disease of the pelvis and the Proximal end of the femur. *J Bone Joint Surg* 2000;82a:114-26.
11. Dutka J, Sosin P. Czas i komfort przeżycia chorych leczonych operacyjnie z powodu złamań patologicznych na tle przerzutów nowotworowych do kości długich. *Ortop Traum Reh* 2003;5: 276-83.
12. Chaberski M, Niedziółka J, Bazan J, Żardecki C. Rola ortopedycznych zabiegów paliatywnych w guzach przerzutowych do kości długich. *Chir Narz Ruchu Ortop Pol* 1996;61 suppl 4a:31-4.
13. Wasilewski A, Konaszczuk T, Chrobowski K, Szymania A. Ryglowane gwoździowanie śródszpikowe w leczeniu przerzutów nowotworowych do kości długich. *Ortop Traum Reh* 2003, 5:327-30.
14. Beals RK, Lawton GD, Snell WE. Prophylactic internal fixation of the femur in metastatic breast cancer. *Cancer* 1971;28:1350-4.
15. Hipp JA, Springfield DS, Hayes WC. Predicting pathological fracture risk in the management of metastatic bone defects. *Clin Orthop* 1995;312:120-35.
16. Keene JS, Sellinger DS, Mc Beath AA, Engber WD. Metastatic breast cancer in the femur: A search for lesion at the risk of fracture. *Clin Orthop* 1986;203:282-8.
17. Harrington KD. Orthopedic surgical management of skeletal complications of malignancy. *Cancer* 1997;80 (8 suppl):1614-27.
18. Ward WG, Spang J, Howe D, Gordan S. Femoral recon nails for metastatic disease: indications, technique and results. *Am J Orthop* 2000;29:34-42.