Available online at www.sciencedirect.com

ScienceDirect

journal homepage: http://www.elsevier.com/locate/pjnns

Original research article

# Percutaneous balloon kyphoplasty in the treatment of painful vertebral compression fractures: Effect on local kyphosis and one-year outcomes in pain and disability

*Krzysztof Zapałowicz* [1,*], *Maciej Radek* [2]

*Department of Neurosurgery and Peripheral Nerve Surgery, Medical University of Łódź, University Hospital WAM-CSW, Łódź, Poland*

ARTICLE INFO

*Article history:*
Received 4 January 2014
Accepted 24 November 2014
Available online 2 December 2014

*Keywords:*
Kyphoplasty
Pain
Vertebral compression fracture
Kyphosis
Osteoporosis

ABSTRACT

*Background and purpose:* The aim of the study was to determine the effectiveness of percutaneous balloon kyphoplasty for treatment of compressive vertebral fractures.

*Materials and methods:* A retrospective analysis was conducted on 24 patients with 58 symptomatic vertebral fractures treated by balloon kyphoplasty. Visual Analogue Pain Scale (VAS) and Oswestry Disability Index (ODI) were used to assess fracture-related pain and patient's disability: preoperatively and within 12-months follow-up. Following the procedures to evaluate the change of vertebral deformity, the angle of local kyphosis was measured.

*Results:* Preoperative VAS score was 6.54, at discharge it significantly regressed in 95.8% of patients. The overall VAS score at discharge was 1.25 and within 12 months decreased to 0.26. Preoperative ODI score was 50%, at follows-up in all patients it decreased, ranging from 21% to 10%. Reduction of local kyphosis was achieved in 30 (51.7%) vertebrae by average 4.3°. In 9 (37.5%) patients kyphosis of all augmented vertebrae was reduced, in 7 (29.2%) patients procedures reduced kyphosis in part of augmented vertebrae and in 8 patients (33.3%) kyphosis remained unchanged. Asymptomatic complications included cement leak in 10 (17%) vertebrae and intraoperative rupture of 4 (4%) balloons.

*Conclusions:* Rapid significant pain relief after kyphoplasty followed by long-term pain release and disability reduction obtained in all patients was most probably the result of vertebral augmentation. The correction of local kyphosis had no influence on the outcome.

© 2014 Polish Neurological Society. Published by Elsevier Urban & Partner Sp. z o.o. All rights reserved.

* *Corresponding author*. Department of Neurosurgery and Peripheral Nerve Surgery, Medical University of Łódź, University Hospital WAM-CSW, Żeromskiego 113, 90-549 Łódź, Poland. Tel.: +48 42 633 30 01; fax: +48 42 633 30 01.
E-mail address: krzysztofzapalowicz1@wp.pl (K. Zapałowicz).
[1] Private/permanent address: Urzędnicza 42 app. 66, 91-304 Łódź, Poland. Tel.: +48 601 42 47 17.
[2] Tel.: +48 42 633 30 01; fax: +48 42 633 30 01.

http://dx.doi.org/10.1016/j.pjnns.2014.11.005

0028-3843/© 2014 Polish Neurological Society. Published by Elsevier Urban & Partner Sp. z o.o. All rights reserved.

## 1. Introduction

There are two minimally invasive percutaneous methods: vertebroplasty and balloon kyphoplasty (BKP), which are widely used for augmentation of vertebrae. The accepted indications for their use include osteoporotic vertebral fractures, spinal myeloma, metastases and haemangiomas [1–5]. In 1987, vertebroplasty was first described as injection of bone cement into vertebral body (VB) causing its mechanical reinforcement and pain relief [1–4]. Vertebroplasty does not inflate the compressed VB; however, in a fraction of fractured vertebrae with mobile bony fragments the reduction in deformity was achieved [2,6]. Percutaneous balloon kyphoplasty (BKP) was introduced in 1998, aiming to correct the kyphotic deformity secondary to vertebral fracture [1,3,4]. In this method two inflatable balloons are inserted under radiofluoroscopic guidance into the VB. Balloons are inflated in order to re-expand the VB and to create a void in its spongious bone, thereafter are deflated and removed. In the next step, the created void is filled with injectable bone cement, most commonly polymethylmethacrylate (PMMA), which consecutively hardens stabilizing the shape of expanded vertebra [1,2,4,5]. After more than a decade of experience, the clinical benefits as well as radiographical results of BKP remain debated [4,6–16]. The objective of this study was to analyse the effects of BKP on correction of local kyphosis, pain relief and patient's quality of life. To the bests of authors' knowledge this is the first clinical study of BKP in Polish literature.

## 2. Materials and methods

This retrospective study included 24 patients (16 females, 8 males) treated with BKP between 2005 and 2008 for painful vertebral compressive fractures (Table 1). The age of participants ranged from 21 to 84 years (mean: 67). The osteoporosis was confirmed in 16 patients based on bone mineral density of the proximal femur, with *T*-score ranging from −2.52 to −6.80 (mean: −3.74). Osteoporosis was classified as: postmenopausal (9 females), senile (1 male), due to malnutrition (1 female treated for anorexia), linked to coeliac disease and bowel resection (2 males), steroid-induced (2 females) and due to testosterone deficiency after orchiectomy (1 male). Amongst remaining patients, osteopenia was diagnosed in six and myeloma in two. A total of 58 fractured vertebrae (29 thoracic, 29 lumbar) were treated. Fractures were diagnosed by X-ray films, computed tomography (CT) or magnetic resonance image (MRI) and were classified according to Magerl et al. [17] as follows: A1.1 ($n = 11$), A1.2.1 ($n = 41$), A1.2.3 ($n = 2$), A3.1.1 ($n = 3$) and A3.1.3 ($n = 1$). Six patients (12 vertebrae) were treated within 3 weeks of symptoms onset, whereas eighteen between 1 and 8 months (mean: 2.5). On examination, all patients presented axial back pain corresponding with the location of fracture and exacerbating by palpation.

The kyphoplasty procedures were performed by the first author, under general anaesthesia, except two realized under sedation combined with local anaesthesia. The patients were placed in prone position, with C-arm installed for biplanar radiofluoroscopic guidance. Kyphon® (Sunnyvale, USA)

**Table 1 – Clinical data for patients undergoing balloon kyphoplasty.**

| Sex/age [years] | *T*-score/comorbidity | Fractured vertebrae | Kyphosis reduction [$\|\Delta\alpha\|$] |
|---|---|---|---|
| 1. F, 74 | −3.18 | L1 | NC |
| 2. F, 38 | −5.2; Anorexia | T5, T6, T8, T10, T11, L1 | T5: 2°, L1: 5° |
| 3. M, 57 | Osteopenia, TS | T7 | T7: 3° |
| 4. F, 80 | Osteopenia | L2 | L2: 7° |
| 5. M, 55 | −2.12; myeloma | T4, T6 | T4: 2°, T6: 5° |
| 6. M, 74 | −3.5; orchiectomy | T12, L1, L2, L4 | T12: 2°, L2: 6°, L4: 4° |
| 7. F, 68 | Osteopenia | L1, L2 | L1: 2°, L2: 5° |
| 8. F, 75 | −2.81 | L3, L4 | L3: 5° |
| 9. M, 41 | −3.7; MS | T12, L1 | NC |
| 10. F, 77 | −3.54 | L2, L4 | NC |
| 11. M, 60 | Myeloma | T11, T12, L1 | T12: 3°, L1: 2° |
| 12. M, 69 | −5.03; MS | T6 | T6: 3° |
| 13. F, 67 | −3.45 | T11, T12 | T11: 3° |
| 14. M, 77 | −2.97 | L2 | NC |
| 15. F, 68 | −1.92; osteopenia, hypothyroidism, TS | T9, T12 | T9: 2°, T12: 2° |
| 16. M, 78 | Osteopenia, RA, ST | T12, L1, L2, L4 | NC |
| 17. F, 78 | −2.82 | L2, L3, L4 | NC |
| 18. F, 21 | −6.8; SLE, ST | T7–T12 | T7: 5°, T8: 10°, T10: 10°, T11: 6°, T12: 3° |
| 19. F, 84 | −2.31; osteopenia | T11, L1 | NC |
| 20. F, 73 | −2.87 | L2, L5 | NC |
| 21. F, 76 | −3.90 | L3 | L3: 6° |
| 22. F, 80 | −3.66 | T9, T10, T12, L2, L3 | T9: 5°, T10: 6°, L3: 2° |
| 23. F, 65 | −2.52 | T8 | T8: 5° |
| 24. F, 69 | −3.83 | L1, L4 | L1: 5°, L4: 3° |
| Mean: 67 | | $N = 58$ | Mean: 4.3°; SD = 2.2° |

F, female; M, male; MS, malabsorption syndrome; NC, no correction; RA, rheumatoid arthritis; SD, standard deviation; SLE, systemic lupus erythematosus; ST, steroidotherapy; TS, tobacco smoker.

Download English Version:

https://daneshyari.com/en/article/2152662

Download Persian Version:

https://daneshyari.com/article/2152662

Daneshyari.com