Kyphoplasty for Compression Spinal Fractures: Two Years Experience with Purified Silicone VK100

Fabrizio Caroli; Stefano Telera MD; Laura Raus; Francesco Crispo; Alfredo Pompili; Carmine Carapella

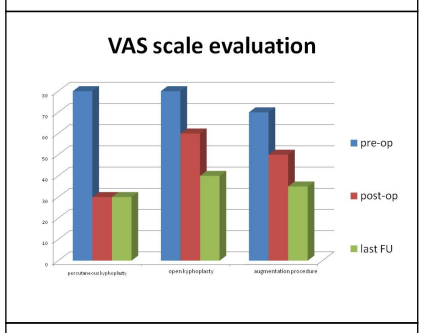
"Regina Elena" National Cancer Institute, Rome, Italy

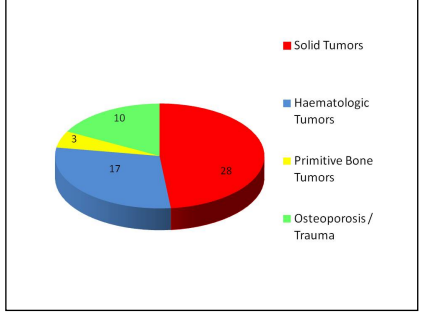
Introduction

Due to its minimal invasion and immediate pain relief ballon kyphoplasty has gained an increased popularity for treatment of symptomatic tumor or osteoporotic vertebral fractures. Kyphoplasty in cancer patients is more challenging than for osteoporotic ones. Cord compression is frequent and the incidence of overall complications is ten-fold greater, reaching 10%. Polimethylmethylacrylate (PMMA) cement is considered the golden standard material for such procedures. Although success rate is high, PMMA has also limitations and safety concerns: exothermic reaction, short working time (5 minutes), rapid solidification, it is not adhesive to bone, leakages are dangerous. VK100 is a mixture of Dimethyl methylvinyl siloxane, Barium Sulphate, Platinum catalysat, and methylhydrogensiloxane cross linker. Polymerisation occurs after mixture. Surgical procedure is the standard kyphoplasty. VK100 adheres to bone, has no exothermic reaction, leaves up to 15 minutes before definitive solidification, is more elastic. The base material has been used in humans for 30 years.

Methods

Between February 2013 and January 2015 we operated 58 patients, 30 females and 18 males, mean age was 66 years (range 40-88 years).
48 were affected by cancer disease (17 haematologic tumors, 28 solid tumors, 3 cordomas) and 10 by trauma and osteoporosis.
28 patients were treated through a percutaneous kyphoplasty, 23 through an "open kyphoplasty" associated with emilaminectomy or laminectomy while an "augmentation vertebroplasty"

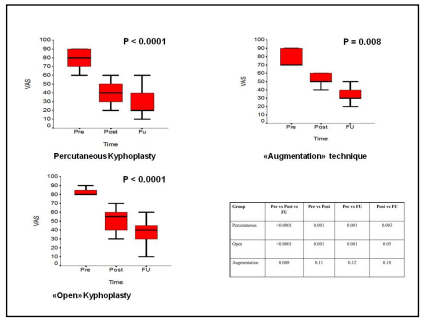




in major open surgery was done in 7 to implement their posterior or lateral stabilization.Overall kyphoplasty with VK100 was performed in 96 vertebral bodies (53 thoracic, 43 lumbar).
All patients performed a post-operative CT scan of the spine and the first 25 also a CT of the thorax to correctly evaluate the intrasomatic distribution of the silicon and the occurrence of pulmonary embolism.

Results

Follow-up ranged between 2 and 24 months. Average working time of the purified silicone was always equal or more than 15 minutes.Complications included two asymptomatic pulmonary embolism, five leakages (intradiscal, endospecal, vascular), two motor deficits requiring in one, surgical revision, three adjacent fractures. One motor deficit was permanent with only mild improvement after physiotherapy. Three patients died after 3, 6, 13 months respectively due to disease progression.
On the contrary, 6 of 11 patients, who presented before surgery a motor deficit, clinically improved after "open" kyphoplasty.
In the 28 patients treated with percutaneous kyphoplasty the median VAS scale decreased from 80 before surgery, to 30 post-operatively and 30 at the last follow-up.
In the group of 23 patients treated with an "open" Kyphoplasty for more complex disease, we observed less dramatic but still valuable results. The median VAS score decreased from 80 preoperatively to 60 post-operatively and 40 at the last follow-up.
In the last group of patients in which VK 100 was employed, to strengthen the adjacent vertebrae in cases of complex somatectomies or vertebrectomies, the VAS score decreased from 70 before surgery to 50 and 35 at the last follow-up. The differences in all three groups appeared to be statistically significative (Friedmann test-Wilcoxon test). A related reduction in analgesic drugs intake was also reported in all patients at the follow-up



Conclusions

This technique seems to be safer than that with PMMA and particularly suited for pathologic vertebral fractures. Leakages may have less severe outcome either for the non-exothermic reaction, or as this material has not the space occupying effect of PMMA. Further studies are needed to confirm these preliminary results. a randomised trial comparing standard PMMA and VK100 is currently ongoing in our Institution.

Learning Objectives

By the conclusion of this sessions, participants should be able to describe the different surgical techniques in which silicone VK100 and PMMA are employed to deal with vertebral compression fractures and identify the difference between these materials.