Cairo University
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KYPHOPLASTY IN ACUTE OSTEOPOROTIC DORSOLUMBAR FRACTURES

Thesis

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By

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ABSTRACT

SEVERAL TECHNIQUES HAVE BEEN DEVELOPED FOR KYPHOSIS SECONDARY TO OSTEOPOROTIC VERTEBRAL COMPRESSION FRACTURES DURING THE LAST 2 DECADES. TECHNIQUES OF VERTEBRAL BODY AUGMENTATION HAVE BEEN DEVELOPED IN AN EFFORT TO TREAT THESE REFRACTORY CASES. THE HIGH PRESSURE INJECTION OF LOW VISCOSITY OF (PMMA) HAS POTENTIAL RISK FOR NEURAL COMPROMISE AND PULMONARY EMBOLISM BY UNCONTROLLED LEAKAGE. THEREFORE, BALLOON KYPHOPLASTY AND VERTEBROPLASTY USING A LARGE CANNULA LOW PRESSURE INJECTION OF PMMA IN A HIGH VISCOSITY STATE HAS BEEN INTRODUCED. PERCUTANEOUS KYPHOPLASTY (PKP) IS A RECENTLY DEVELOPED, MINIMALLY INVASIVE SURGICAL TREATMENT FOR OVCF. COMPLICATIONS FOR BALLOON KYPHOPLASTY INCLUDE NON-TARGET PMMA EMBOLIZATION, ADJACENT VERTEBRAL BODY OR RIB FRACTURE AND INFECTION.

KEY WORDS: VERTEBRAL BODY, COMPRESSION FRACTURES, PMMA, KYPHOSIS, PERCUTANEOUS KYPHOPLASTY.

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Dedication

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LIST OF ABBREVIATIONS

ADL	Activities of daily living
AS	Ambulatory status
atm	atmospheric pressure
BKP	Balloon kyphoplasty
BMD	Bone mineral density
CT	Computed tomography
DEXA	Dual energy absorptometry
FDA	Food and drug administration
FU	Follow-up
IBT	Inflatable balloon tamps
IVD	Intervertebral disc
MRI	Magnetic resonance imaging
ODI	Oswestry disability index
OVCFs	Osteoporotic vertebral compression fractures.
P/Y	Person ⁄ year
PKP	Percutaneous balloon kyphoplasty
PMMA	Polymethylemethacrylate
PSI	Pound/ $(\text{inch})^2$
ROM	Range of movement
RTA	Road traffic accident
SLR	Straight leg raising test
STIR	Short T1 inversion recovery
VAS	Visual analogue scale
VCFs	Vertebral compression fractures.

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The National Osteoporosis Foundation has estimated that more than 100 million people worldwide are at a risk for the development of fractures secondary to osteoporosis. Osteoporotic Vertebral compression fractures (OVCFs) constitute a major health care problem in western countries, not only because of the high incidence of these lesions but also due to their direct and indirect negative consequences for patient health-related quality of life and the costs to the health care system. [(1)]

Compression fractures lead to a loss of height of the vertebral segment, and the resulting spinal deformity can lead to a decrease in pulmonary capacity, malnutrition, decreased mobility, and depression. Kyphosis secondary to osteoporotic vertebral compression fractures is associated with a (2) to (3) times greater incidence of death due to pulmonary causes. Although usual treatment of an osteoporotic vertebral compression fracture consists of bed rest, analgesics, and bracing, some fractures go on to progressive deformity and debilitating pain. [(2, 3)]

Several techniques have been developed for simpler and safer procedures during the last 2 decades. Techniques of vertebral body augmentation have been developed in an effort to treat these refractory cases. [(4)]

The high pressure injection of low viscosity of (PMMA) has potential risk for neural compromise and pulmonary embolism by uncontrolled leakage. Therefore, balloon kyphoplasty and vertebroplasty using a large cannula low pressure injection of PMMA in a high viscosity state has been introduced. Percutaneous kyphoplasty (PKP) is a recently developed, minimally invasive surgical treatment for OVCF. [4]

PKP with acrylic cement (PMMA) is a procedure aimed at preventing vertebral body collapse and pain in patients with pathologic vertebral bodies. PKP is a promising therapeutic technique for pain control in patients with bone failure. PKP for OVCFs is typically performed by delivering double balloons via a bilateral or unilateral transpedicular approach; balloons are inflated simultaneously for elevating the end plate for accompanying vertebral body height balanced restoration. The deformity is purportedly corrected by the insertion and expansion of a balloon in a fractured vertebral body. [5]

After reduction of the fracture bone, cement is then deposited into the cavity created by the balloon to repair the fracture. Good clinical outcomes as well as restoration of vertebral body height have been reported with kyphoplasty. Absolute contraindications to any vertebral augmentation procedure include asymptomatic osteoporotic vertebral compression fractures, ongoing local or systemic infection, uncorrectable coagulopathy, or improving pain on medical therapy. Fractures of the posterior elements (without vertebral body fracture) are another absolute contraindication. [5, 6, 7]

Complications for balloon kyphoplasty include non-target PMMA embolization, adjacent vertebral body or rib Fracture and infection. [8]