

Osteoporotic Spine Fractures: Incidence and Management Outcome



Medical Science

KEYWORDS :

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ABSTRACT

INTRODUCTION

Multiple medical treatments available for Osteoporotic vertebral compression fractures including hormone replacement therapy, calcitonin, and bisphosphonates--are effective in maintaining or increasing bone mass and reducing the risk of compression fracture.

MATERIALS AND METHODS

60 patients attending Civil Hospital Ahmedabad during July,2012 to July to April 2014 were included in study.

OBSERVATIONS AND RESULTS

The study consists of 60 cases of osteoporotic vertebral fractures. The data analyzed to the following findings. Fracture rate is high in the age group of 61-70 and female to male ratio of 2. Rate of osteoporosis and osteomalacia increased drastically in age groups above 60 years which is associated with increased BMI. PCS score improvement was more in Vertebroplasty (avg 12.0 -18.0) compared with calcitonin and teriparatide (avg 6.0-12.0). MCS score improvement was more in Vertebroplasty (avg 12.0 - 18.0) compared calcitonin and teriparatide (avg 6.0 -12.0). Mean recovery period for calcitonin is observed to be 140 days teriparatide to be 60 days and for vertebroplasty to be 15 days.

CONCLUSION

All patients of osteoporotic vertebral fractures should be given initial conservative treatment for 6 weeks in the form of calcium, vitamin D3, bracing and analgesics. At the end of 6 wks, patients who have intolerable pain, vacuum sign on MRI and who are willing and fit for surgery should be operated for vertebroplasty under general or local anaesthesia, whereas patients who have relief in pain were continued conservative treatment alongwith anti-osteoporotic medications like calcitonin or teriparatide. However there is no significant difference in the treatment due to either calcitonin or teriparatide as calcitonin is associated with lower efficacy but higher compliance due to easy mode of delivery and immediate pain relief, while teriparatide has higher efficacy but lower compliance due to high treatment cost and no immediate pain relieving effect. Teriparatide therapy is preferred for those who have repeated and multiple new-onset vertebral compression fractures (VCF).

INTRODUCTION

Osteoporotic vertebral compression fractures are a commonly encountered clinical problem. Although the majority of patients with this injury experience a benign and self-limited course of gradually resolving pain, a significant number continue to experience chronic pain and disability. Multiple medical treatments--including hormone replacement therapy, calcitonin, and bisphosphonates--are effective in maintaining or increasing bone mass and reducing the risk of compression fracture. Conventional treatment in the form of pain medication, activity limitation, and occasionally bracing is effective in returning most patients to their previous level of functioning. When therapies fail, patients may be considered for minimally invasive treatments such as vertebroplasty or kyphoplasty.

AIMS AND OBJECTIVES

To study incidence and various treatment modalities in osteoporotic spine fracture.

MATERIALS AND METHODS

60 patients attending Civil Hospital Ahmedabad during July,2012 to July to April 2014 were included in study.

STUDY DESIGN

Randomized, prospective study was done.

All patients were divided in four groups.

- 1.calcium and vit D3 group.

- 2.calcitonin group
- 3.teriparatide group
- 4.vertebroplasty group

INCLUSION CRITERIA

- BMD<-2.5 SD(OSTEOPOROTIC) on DEXA scan
- AGE> 50 Years
- Compression fracture at one or more level
- Fracture occurred due to trivial trauma only

EXCLUSION CRITERIA

- Patients with severe comorbid conditions
- History of significant trauma

METHODS

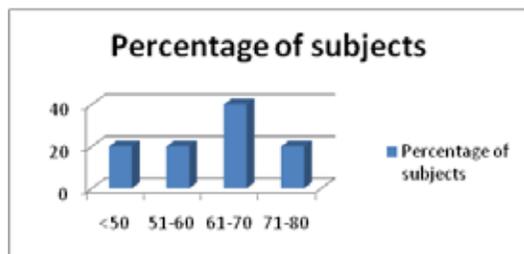
All patients were given conservative treatment in form of calcium and vit D3,bracing,analgesics,Medications as per their groups for 6 weeks.At the end of 6 wks,Who had intolerable pain,vacuum sign on MRI,failed conservative treatment And willing and fit for surgery were operated for vertebroplasty under general as well as local anaesthesia.Patients who had relief in pain were continued conservative treatment for 1 year.Assessment of patient were done on basis of SF36 version 2 scores at every 3 months for 1 year.

FOLLOW UP

Patients were followed up at every 3 months for 1 yr and on every visit SF36v2 scores were noted and also complications occurred were noted.

OBSERVATIONS AND RESULTS

Age Distribution of subjects:

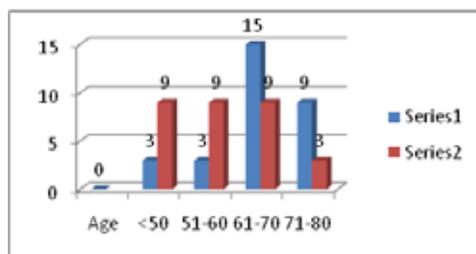


Thus, in our study of 60 patients it was observed that 40% patients fell in the age group of 61-70 years than in other age groups. Fracture rate is high in the age group of 61-70 because of many associated medical illness and associated osteoporosis in that age group.

Sex wise distribution of subjects

In our study it was observed that out of total of 60 subjects 40 were females compared with 20 males. Thus it was seen that there was female to male ratio of 2 because we found that osteoporosis is quite common in females compared to males after menopause.

BMD class in age wise distributed subjects



It was observed that only 25% had BMD below 0.8 in age groups <60 years while in age group >60 years 66% patients had BMD below 0.8. Rate of osteoporosis and osteomalacia increased drastically in age groups above 60 years.

Impact of Smoking on new vertebral fractures

In our study we observed that out of 60 patients only 13 were smokers and rest 47 were nonsmokers. Thus 21.11% new vertebral fractures were associated with smoking. Thus smoking seemed to be protective in preventing new vertebral fractures.

Impact of Drinking on new vertebral fractures

In our study we observed that out of 60 patients only 14 were alcohol drinkers and rest 47 were non alcoholics. Thus 23.33% new vertebral fractures were associated with alcohol. Thus alcohol seemed to be protective in preventing new vertebral fractures.

Comparison of various treatment modalities

	Calcitonin	Teriparatide	Vertebroplasty
Good compliance	100%	60%	62.50%
Mortality	0%	0%	8.33%
Complication rate	4.70%	0	8.30%
Duration of hospital stay(in days)	<1	1.5	9
Recovery period(in months)	4	2	1
Subsequent fractures	4.76%	0%	8.30%

Patient compliance

Compliance was best seen with calcitonin nasal spray and worst with teriparatide because of drastic immediate pain relief and easy mode of delivery given by calcitonin. Longer duration of treatment without much immediate pain relief led to lesser compliance in teriparatide group.

Mortality

It was observed in our study that patients treated with calcitonin and teriparatide had no mortality compared to patients treated with vertebroplasty who had 8.33% mortality. Apart from the risks of operative procedure, compliance and patient selection led to above results.

Complication rate

Teriparatide had least (0%) complications than Calcitonin (4.76%) and Vertebroplasty (8.33%). Calcitonin was associated with allergic reactions while vertebroplasty was associated with cement leakage and wound infection.

Duration of hospital stay

Both calcitonin and teriparatide gave good immediate pain relief leading to less hospital stay. Vertebroplasty gave good immediate pain relief but hospital stay increased due to strict post operative care to avoid post operative complications.

PCS score improvement

PCS Score Improvement	Calcitonin	Teriparatide	Vertebroplasty
0-5.9	9	3	1
6.0 – 11.9	6	9	11
12-17.9	6	3	9
>18	0	0	2
Total	21	15	24

it is observed that PCS score improvement was more in Vertebroplasty (avg 12.0 -18.0) compared with calcitonin and teriparatide (avg 6.0-12.0)

Chi-square value -5.232 p.value-0.514

MCS score improvement.

MCS Score Improvement	Calcitonin	Teriparatide	Vertebroplasty
0-5.9	2	0	3
6.0-11.9	12	11	14
12-17-9	8	10	2
>18	2	0	0
Total	24	21	15

it is observed in our study MCS score improvement was more in Vertebroplasty (avg 12.0 – 18.0) compared calcitonin and teriparatide (avg 6.0 -12.0)

Chi square value-11.909, p-value-0.064

Recovery period

In our study we observed that most of the patients treated with calcitonin recovered within 4 months, most of the patients treated with teriparatide recovered within 2 months and most of the patients treated with vertebroplasty recovered within 1 month. Mean recovery period for calcitonin is observed to be 140 days teriparatide to be 60 days and for vertebroplasty to be 15 days.

Subsequent fractures

In our study 8.3% of patients treated with vertebroplasty and 4.76% patients treated with calcitonin encountered subsequent vertebral fractures.

DISCUSSION

Vertebral fractures result in a deterioration of the health-related quality of life mainly through back pain, reduced physical capa-

bility, perceived poor general health and emotional status (e.g. fear of falling, lack of independence, purposeful limitation of activity and of social interactions)

In contrast to previous study of Pawel Szulc¹, Mary L Bouxsein et al, international osteoporosis foundation, our study showed 66% new vertebral fractures were females and majority fell in the post menopausal age group suggesting post menopausal osteoporosis as a significant contributor to the condition.

Both the studies showed more improvement in PCS and MCS scores of SF-36v2 invertebroplasty group in comparison to conservative treatment group.

In accordance with many previous studies, In our study It was observed that only 25% had BMD below 0.8 in age groups <60 years while in age group >60 years 66% patients had BMD below 0.8. Rate of osteoporosis and osteomalacia increased drastically in age groups above 60 years. The risk of vertebral fractures increases significantly with decreasing BMD .

Diamond et al demonstrated a 53% improvement in pain scores and a 29% improvement in physical functioning 24 hours after vertebroplasty. At 2 weeks, vertebroplasty patients used fewer analgesics and had significantly better quality of life and disability scores. Mean recovery period for calcitonin is observed to be 140 days, teriparatide to be 60 days and for vertebroplasty to be 15 days. Thus our study reconfirmed the findings of Diamond et al.

As per the conclusions of many previous studies, In our study also it was observed that patients treated with calcitonin had 100% compliance, that with teriparatide had 55% and that with vertebroplasty had 66%. Compliance was best seen with calcitonin nasal spray and worst with teriparatide mostly because of treatment cost and no immediate pain relieving effect as compared to calcitonin and vertebroplasty.

In a study of 115 patients, the incidence of new fractures in patients with secondary osteoporosis and primary osteoporosis was 48.6% and 11.3%, respectively⁹⁻¹⁰.

In our study patients treated with calcitonin and teriparatide had no mortality compared to patients treated with vertebroplasty who had 8.33% mortality. Apart from the risks of operative procedure, compliance and patient selection led to above result. But we can conclude that overall mortality was significantly reduced in patients who were given treatment with calcitonin, teriparatide and vertebroplasty.

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