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Role of bone morphogenic protein in osteoporotic fracture a study done on rat models

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Abstract
Introduction: Osteoporosis is a common helth problem of elderly peple and post menopausal female in whom aesnogen withdrawal leads to further decrease in bone density. Low bone mass in osteoporotic bone make the bone fragile and more susceptible to fracture. Bone morphogenic protein play a critical role in it. It was initially discovered as component of demineralised bone extracts that promote bone heading. Aim of this study was to determine the effect of single dose of bone morphogenic protein (BNP-7) Plus a collagen composite in fracture healing in osteoporotic rat models.
Methods: 40 Albino Female rat. Ovarectomy was done. After three months mid shagt fracture of femur on the left side was performed and the fracture was fixed with K-wire 1.6mm diameter. Rats were randomized into groups each group has (n=20). One group was given BMP-7+ collagen- I 68.77mg collagen-I. Collagen –I alone was used in other group (0.2ml) as control at the fracture site Muscle and skin were than colosed at the end of the procedure. Rats from each group were examined at day 12, 20 and 31 post surgery. X-ray film was taken in each rats in frontal projection.
Observation: Radiographs were examined to numerically descrife the callus fromed in both groups. Significant enhancement in callus formation and maturity was observed in the group treated with BMP-7 at all point of time. Bridging callus and fracture remodeling was visible in radiographs of BMP-7 treated group which indicates more active. Fracture healing in the presence of BMP-7 that in coutrol group.
Conclusion: Osteoporosis is a growing health problem. It is charactensed by a high risk of bone fracture and the healing process is also retarded. There are few treatment options available for osteoporosis. This studay shous that BMP-7 increases healing potety in long bone fractures in experimental rat models BMP-7 stimulates new bone formation increases bone mineral density and enhancks the strength of bone as compared to control.

Keywords: morphogenic protein, osteoporotic, fracture, osteoporosis

Introduction
Osteoporosis is a common helth problem of elderly peple and post menopausal female in whom aesnogen withdrawal leads to further decrease in bone density. Low bone mass in osteoporotic bone make the bone fragile and more susceptible to practare. Lack of oestrogen retards bone formation therefore the healing is also impared. Fracture healing process in Osteoporosis should be enhanced and Bone morphogenic protein play a critical role in it. It was initially discovered as component of demineralised bone extracts that promote bone heading. Aim of this study was to determine the effect of single dose of bone morphogenic protein (BNP-7) Plus a collagen composite in fracture healing in osteoporotic rat models.

Materials and Methods
Study was performed in the department of Pharmacology MGM Medical College Jamshedpur.
40 Albino Female rat. Ovarectomy was done.After three months Mid shagt fracure of femur on the left side was performed and the fracture was fixed with K-wire 1.6mm diameter. Wire was passed in the retrograde manner in proximal fragment than into distal fragment. Rats were randomized into groups each group has (n=20). one group was given BMP-7+ collagen- I 68.77mg collagen-I.
Collagen –I alone was used in other group (0.2ml) as control at the fracture site Muscle and skin were than colosed at the end of the procedure. The procedure was performed under inhalational anesthesia by using Halothare.
Rats from each group were examined at day 12, 20 and 31 post surgery.
X-ray film was taken in each rats in frontal projection. For better observation they were exposed for 60 Sec at 20kv. Three observeses examined the film and the following tools were used by the observers independently.
Radiograps were graded in the following manners and the mean I standard error was calculated
Grade I: No callus visible
Grade II: Small amount of flaffy callus present at bone ends.
Grade III: External bridging callus
Grade IV: Bridging callus with callus between bone ends.

These parameters were assigned points in following way:-
1. Visible callus on one side of fracture at one end-4
2. Bridging callus on one side -2
3. Callus between fucture fragments on one side-2
4. Evidence of remodeling of callus on one side-2

Points were added to get a score ranging from 0 to 10

Observation & Discussion

Radiographs were examined to numerically descrife the callus fromed in both groups. Significant enhancement in callus formation and maturity was observed in the group treated with BMP-7 at all point of time. Bridging callus and fracture remodeling was visible in radiographs of BMP-7 treated group which indicates more active. Fracture healing in the presence of BMP-7 that in coutrol group.

Table 1

Day	Treatment	Grade	Score
12	BMP-7	3-26 ± 0.35	6.24 ± 1.2
20	BMP-7	3.33 ± 0.35	7.27 ± 2.0
31	BMP-7	3.47 ± 0.28	7.99 ± 1.33

Table 2

Day	Treatment	Grade	Score
12	Control	1.04 ± 0.22	0.1 ± 0.23
20	Control	1.43 ± 0.4	1.3 ± 0.1
31	Control	1.7 ± 0.23	2.7 ± 1.27

All the resules were reported as mean ± S.D Differences were significant in both groups $P<0.05$.

Conclusion

Osteoporosis is a growing health problem. It is charactensed by a high risk of bone fracture and the healing process is also retarded. there are few treatment options available for osteoporosis. this studay shous that BMP-7 increases healing potety in long bone fractures in experimental rat models BMP-7 stimulates new bone formation increases bone mineral densityand enhancks the strength of bone as compared to control.

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