Significance of Serum Intact Procollagen Type 1 Aminoterminal Propeptide Level in Patients with Spinal Osteoporosis

Dep.of Orthop Surg.,
Takamatsu Municipal Hospital,
Takamatsu,Japan

R.Miyake T.Kasai A.Inui

Background

Although bone resorption markers have recently been used for the evaluation of spinal osteoporosis in addition to bone mineral density, new bone formation markers are now being sought in addition to those currently in use.

Intact procollagen type 1 aminoterminal propeptide (P1NP) reflects accurate bone formation and turnover; however, it has not been determined in patients with spinal osteoporosis.

Purpose

This study was performed to investigate the clinical significance of the intact P1NP level in patients with spinal osteoporosis.

Materials

This study included 196 female patients with spinal osteoporosis who were treated in this hospital.

The age of patients ranged from 49 to 95 years with an average of 75.3 years.

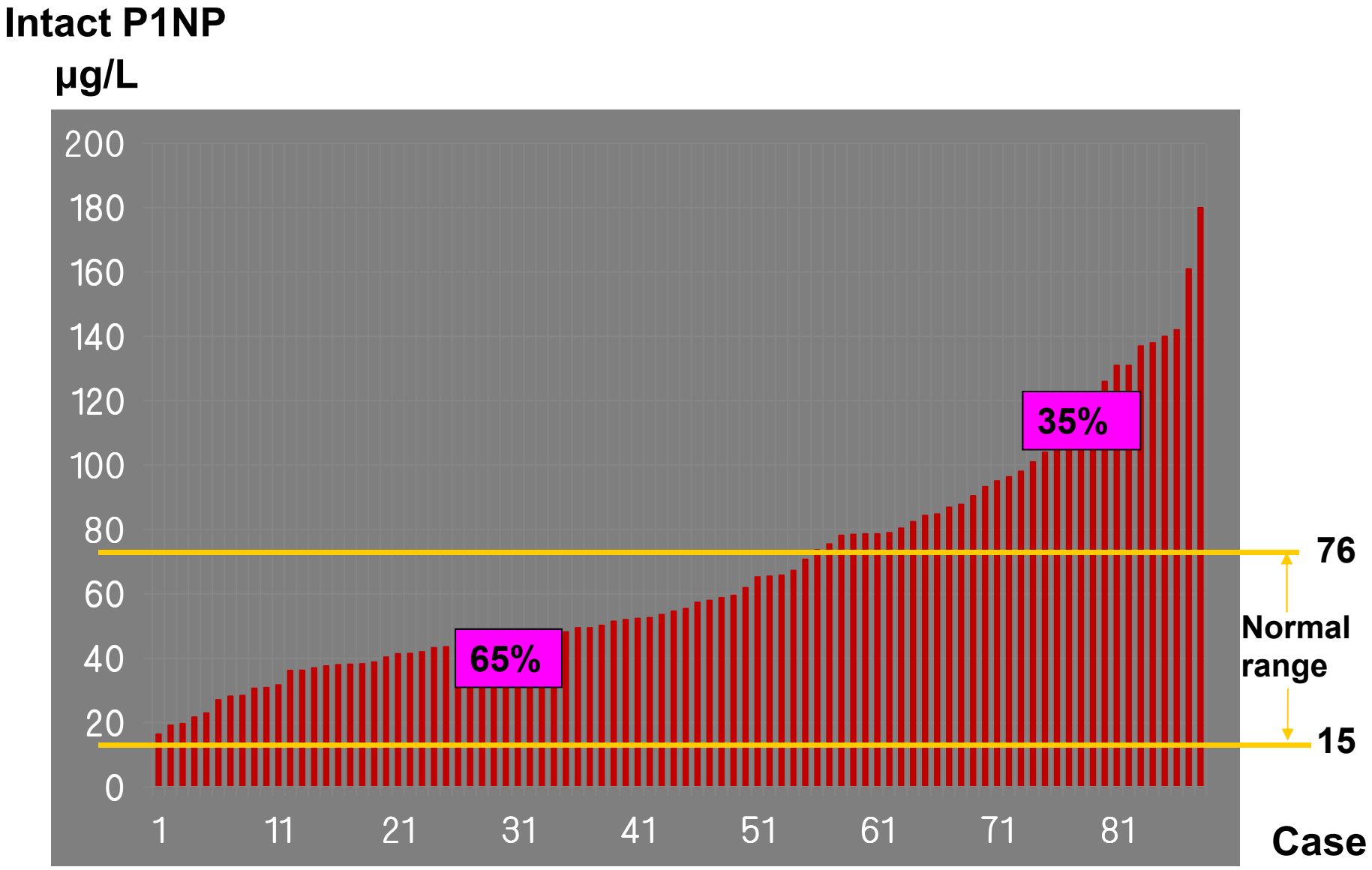
Methods

1) Serum Intact Procollagen Type 1 Aminoterminal Propeptide was measured in all patients.

2) The relationship between intact P1NP and BMD, TRAP-5b, ucOC and number of fractured vertebral body was investigated.

3) Changes in the intact P1NP level were also examined after the administration of teriparatide.

Distribution of the intact P1NP level

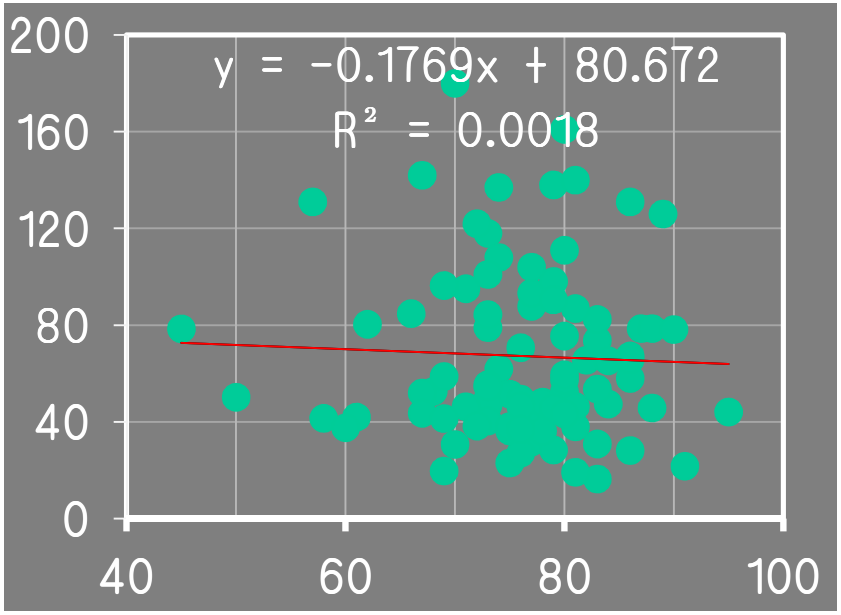


Age v.s intact P1NP

Intact P1NP

µg/L

N =92



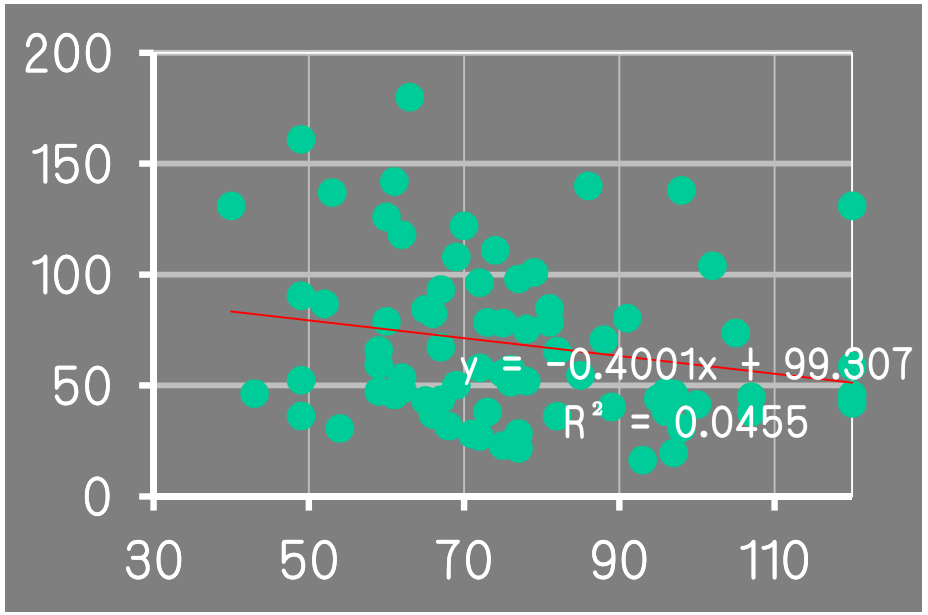
Age

BMD v.s intact P1NP

Intact P1NP

µg/L

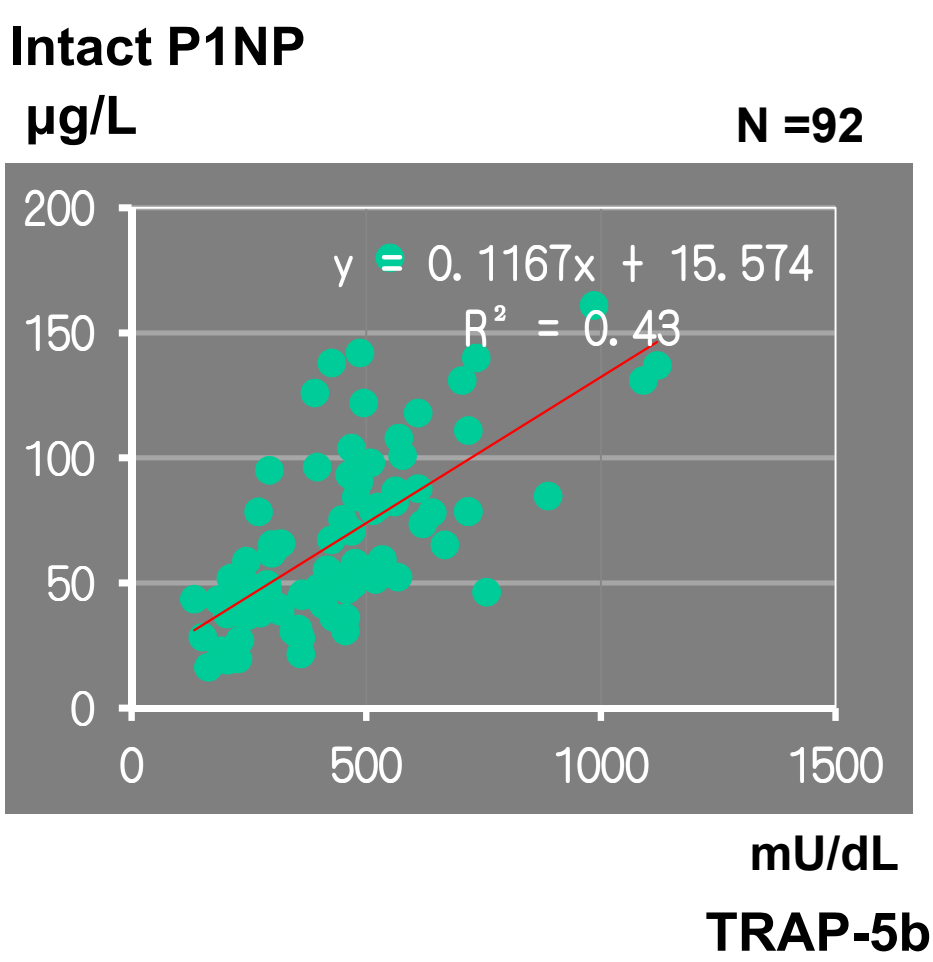
N =92



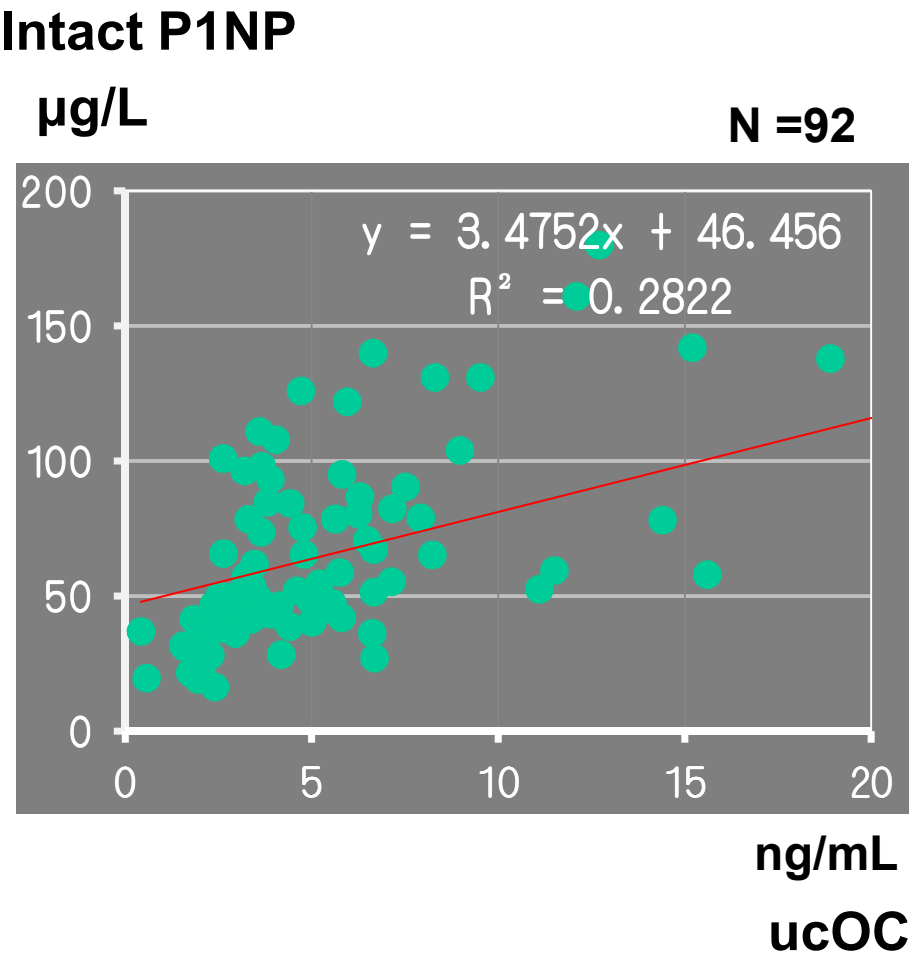
g/cm²

BMD

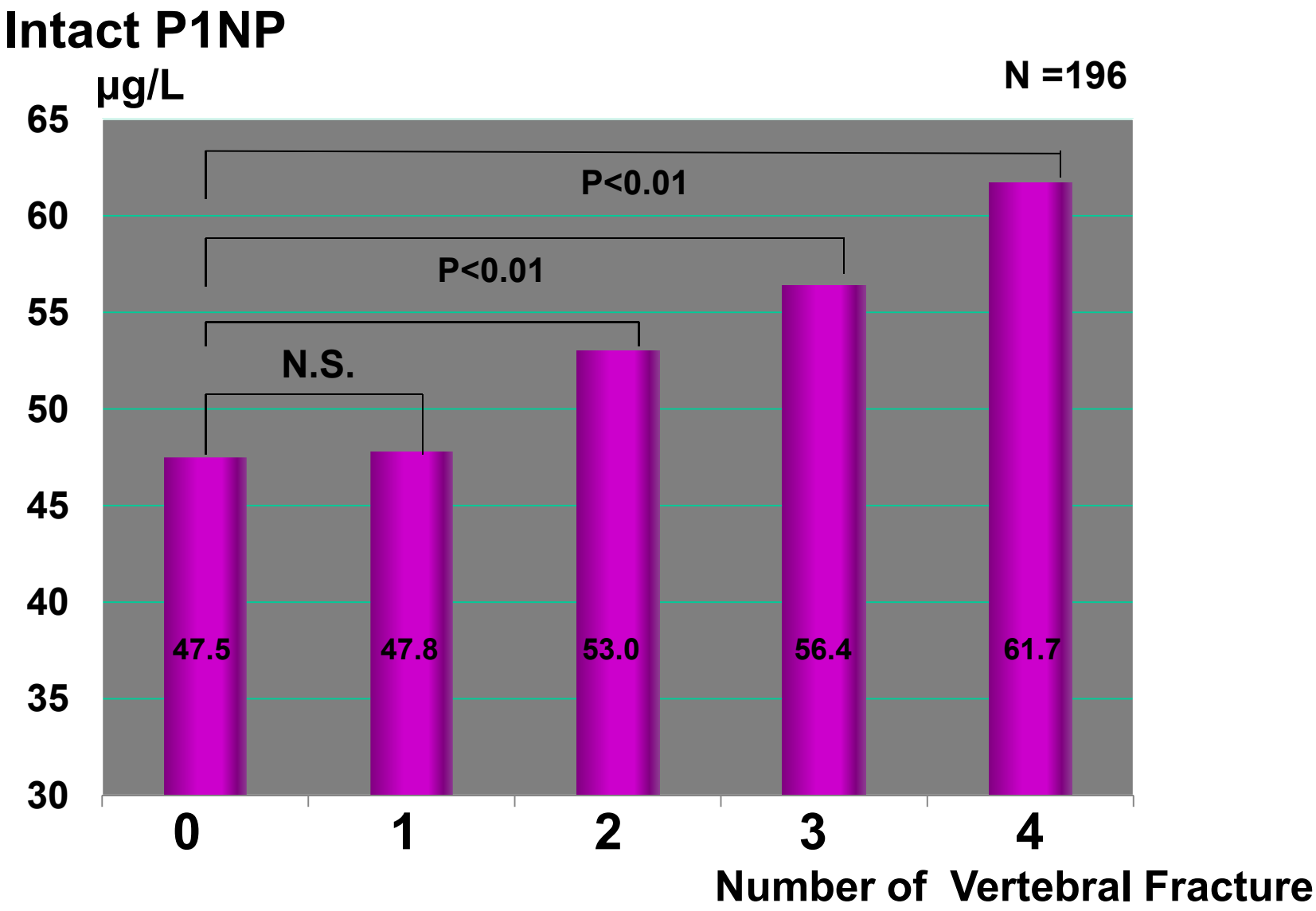
TRAP-5b v.s intact P1NP



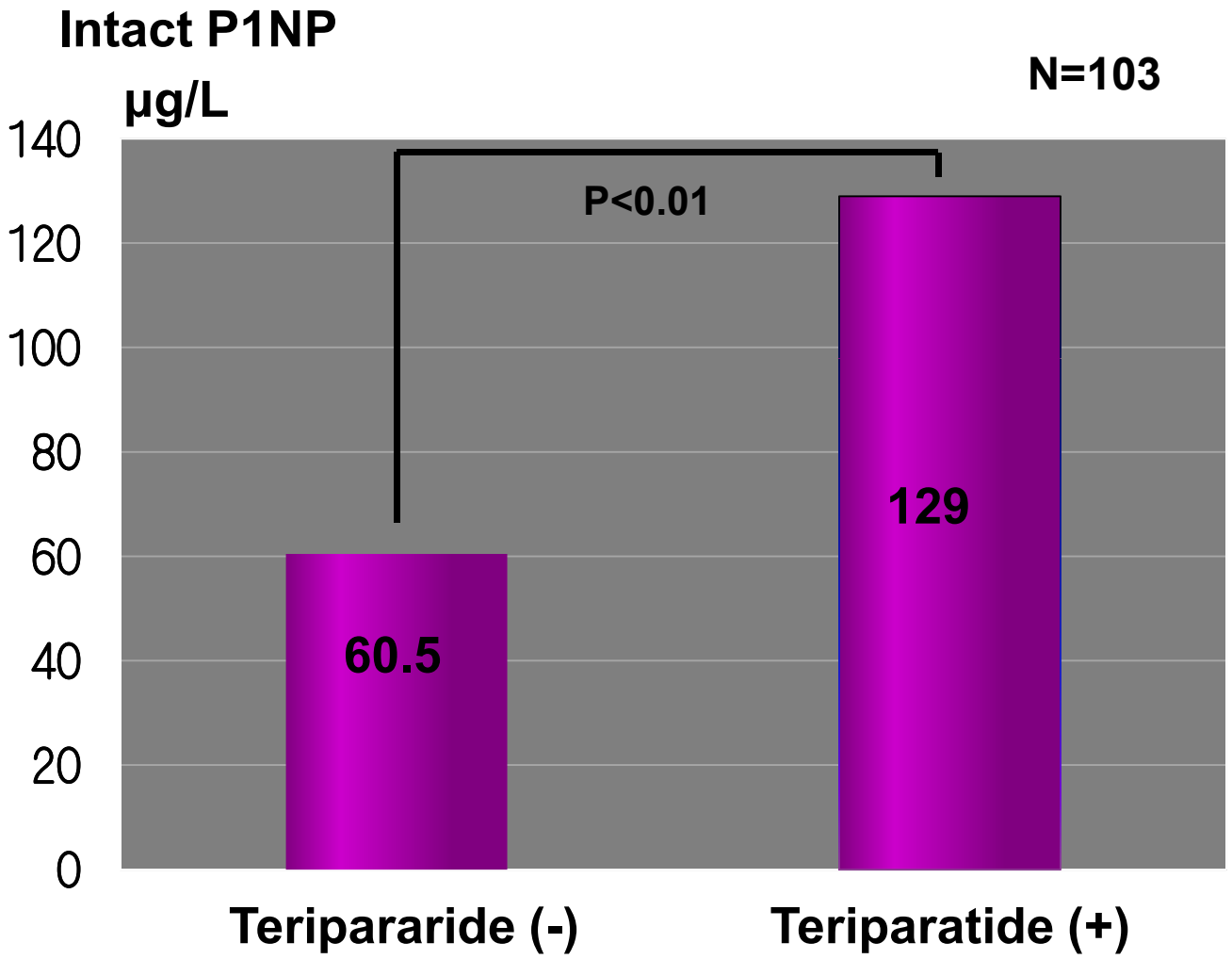
ucOC v.s intact P1NP



Fragile Vertebral Fracture v.s intact P1NP



Changes in intact P1NP level after the administration of Teriparatide



Bone metabolism marker

1）Bone resorption

DPD(Deoxypyridinoline）

NTX(cross-linked N-telopeptide of type I collagen)

TRAP-5b(Tartrate-Resistant Acid Phosphatase-5b)

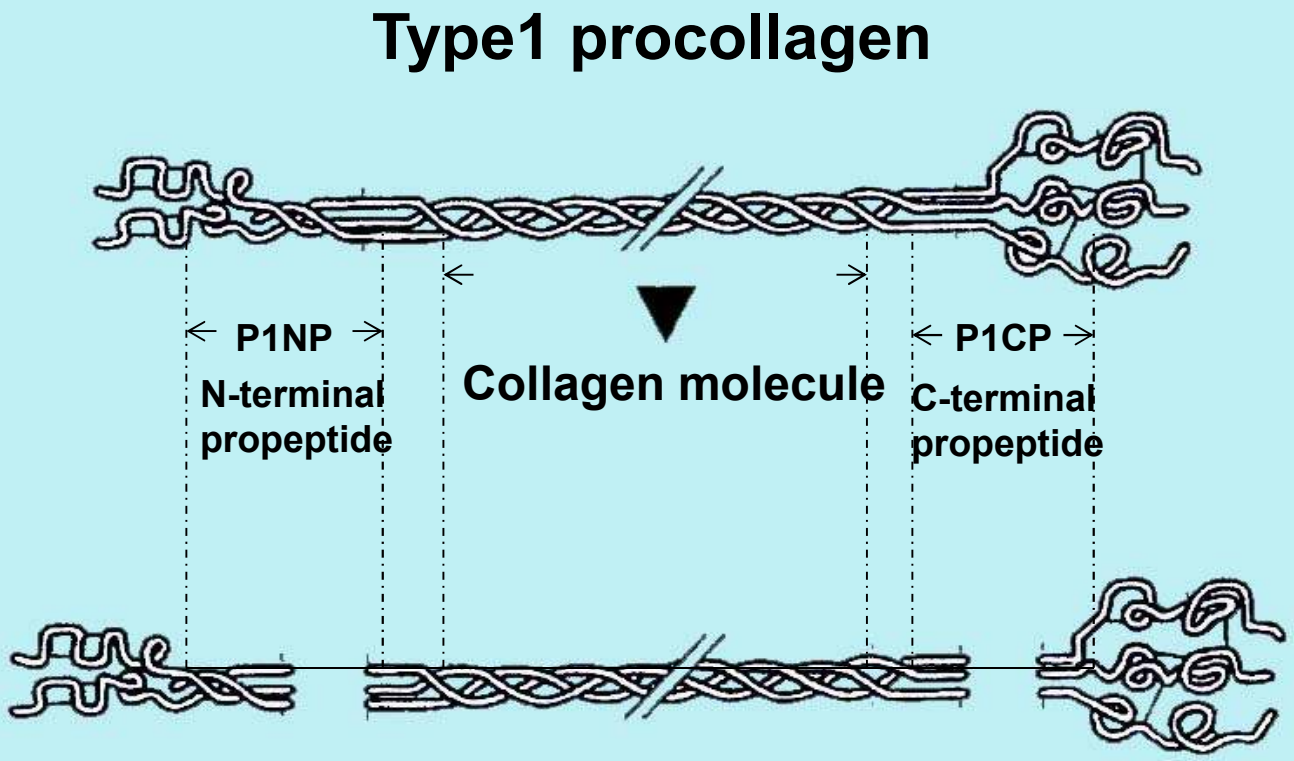
2）Bone formation

OC(Osteocalcin)

BAP(Bone Specific Alkaline Phosphatase)

Intact P1NP that is derived from collagen and specific for osteoblast.

Synthesis of collagen



Osteoblasts generate type1 procollagen that changes to type1 collagen after separation of two terminal propeptide (P1NP and P1CP).

IntactP1NP

A high level of Intact P1NP before treatment reflects the increase in bone turnover, not a state where the bone mass is increasing. The bone mass is lost in the future.

The results of this study

- **BMD v.s intact P1NP → Negative correlation**
- **TRAP-5b and ucOC v.s intact P1NP → Positive correlation**
- **The P1NP level was higher as the number of vertebral fracture increased.**

Conclusion

The intact P1NP level reflects bone turnover, which is considered to be a predictor of a decrease in bone mass and fracture risk for the osteoporotic spine.

In addition, the determination of the P1NP level may be useful in monitoring the effect of treatment with bone formation accelerators, such as teriparatide.

None of the authors has any potential conflict of interest.

-grants/research support	-stock/shareholder	-employee
-consultant	-royalties	**none**