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## Bone Carcinosis

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### Bone carcinosisについて

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bone carcinosis は全身の赤色髄が転移性の癌組織に置換されたものである。本論文は著者の14例を中心とし、文献からの24例を加えて検討したものである。

骨のX線所見は osteoblastic 型、osteolytic 型、両者の混合型、壊死型、Paget 病型、osteopathia striata 型に分けられる。

一般に、胃癌の転移が最も多く、40才以下の女性に比較的高率である。局所症状は少なく、全身症状を主とし、とくに疼痛が強く、類白血病反応が高率にみられる。生前の診断率は案外低いが、読影力があるならば比較的容易であり、その場合、胸部X線像1枚で診断が可能である。

While multiple metastasis of cancer to the bone is frequently seen, the type of diffuse and extensive metastasis to all bones (bone carcinosis) is not common. The authors experienced 14 cases of this disease over a period of approximately 10 years. These cases are reviewed together with 24 cases reported in Japanese literature.

### Definition of Bone Carcinosis

Bone metastasis of cancer is bone marrow metastasis, accurately expressed. Bone carcinosis is the state in which all the red marrow is replaced by cancer tissue. Fig. 1 is the distribution of the red marrow in Japanese according to Hashimoto. The dark portion in this Figure is replaced by cancer tissue in this condition.

### Cases

Table 1 summarizes 14 cases of our own experience, and summarized 24 cases collected from Japanese literature.

#### 1. Primary cancer

In the authors' series, gastric cancer was found in 10 cases, melanomatosis in 1, and the primary

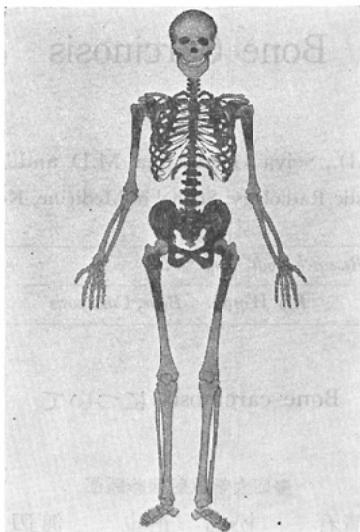


Fig. 1. Distribution of red marrow in Japanese according to Hashimoto

Table 1. Clinical and radiological findings of 14 cases of authors

| No. | age | sex | primary cancer | metastatic region of skelet | changes of bone         | chest X-ray findings                                 | gastric lesion     | leuke-moid reaction |
|-----|-----|-----|----------------|-----------------------------|-------------------------|--|--------------------|---------------------|
| 1   | 34  | M   | gastric cancer | red marrow                  | osteoplastic osteolytic | 1) : increased lung marking<br>2) : many fine flecks | unknown            | +                   |
| 2   | 28  | M   | gastric cancer | red marrow                  | osteoplastic osteolytic | 1)+2)  | small ulcer        | +                   |
| 3   | 48  | F   | gastric cancer | red marrow                  | osteoplastic            | 1)+2)  | Borrmann Ⅲ         | +                   |
| 4   | 46  | F   | gastric cancer | red marrow                  | necrotic                | 1)+2)+increased hilar shadow                         | Borrmann Ⅳ         | -                   |
| 5   | 51  | M   | gastric cancer | red marrow                  | osteoplastic            | 1)+2)  | Borrmann Ⅲ         | -                   |
| 6   | 22  | F   | gastric cancer | red marrow                  | osteoplastic            | 1)+2)+increased hilar shadow                         | Borrmann Ⅳ (small) | +                   |
| 7   | 65  | M   | gastric cancer | red marrow                  | osteoplastic osteolytic | 1)+2)  | Borrmann Ⅳ         | -                   |
| 8   | 30  | F   | gastric cancer | red marrow                  | osteoplastic osteolytic | 1)+2)+increased hilar shadow                         | Borrmann Ⅳ         | +                   |
| 9   | 23  | F   | gastric cancer | red marrow                  | osteoplastic            | 1)+2)  | Borrmann Ⅳ (small) | -                   |
| 10  | 63  | F   | gastric cancer | red marrow                  | osteopathia striata     | 1)   | Borrmann Ⅲ         | -                   |
| 11  | 34  | F   | melano-sarcoma | red marrow                  | Paget's disease         | 1)+2)  |                    | +                   |
| 12  | 64  | M   | unknown        | red marrow                  | Paget's disease         | 1)+2)  |                    | +                   |
| 13  | 51  | M   | unknown        | red marrow                  | Paget's disease         | 1)+2)  |                    | +                   |
| 14  | 60  | F   | unknown        | red marrow                  | necrotic                | 1)+2)  |                    | +                   |

site was unknown in 3. In cases collected from Japanese literature, gastric cancer was found in 18, prostatic cancer in 3, mammary cancer in 2 and uterine cancer in 1. Prostatic cancer frequently seen in overseas was rare and gastric cancer was predominant.

## 2. Age and sex

In the authors' series, 3 patients were in the 20s, 3 in the 30s, 2 in the 40s, 2 in the 50s, and 4 above 60. In cases collected from the literature, 6 were found in the 20s, 6 in the 30s, 5 in the 40s, 4 in the 50s, and 3 in the 60s. Young patients were predominant and the ordinary cancer peak between ages of 40 and 60 was absent. As regards sex, deviation occurred as expected in prostatic cancer, mammary cancer, and uterine cancer. Among 28 cases of gastric cancer, there were 14 males and 14 females, indicating an equal involvement unlike the proportion of gastric cancer in general. In other word, bone carcinosis is frequently seen in young females.

## 3. Symptoms

As for general symptoms, anemia, general malaise, weakness, weight loss, anorexia, and hemorrhagic tendency are noted but local symptoms are rare. In gastric cancer, most of the epigastric symptoms are hidden. In general, persistent pain is characteristic, seen in more than 80% of the cases.

## 4. Findings in peripheral blood

As for findings in peripheral blood, anemia, nuclear red cells, increased red cells, leukopenia, leukocytosis, shift of nuclei to the left, appearance of metamyelocyte, and leukemoid reaction are experienced. Diagnosis of leukemoid reaction is based on 1) white blood count above 50,000. 2) Appearance of juvenile type white cells up to myeloblasts.

## 3. Combination of both

This was seen in 10 of 24 cases collected from Japanese literature and 9 of 14 cases of the author's own experience.

### X-ray Picture of the Bone

#### 1. Osteoblastic type (Case 3, 5, 6, 9)

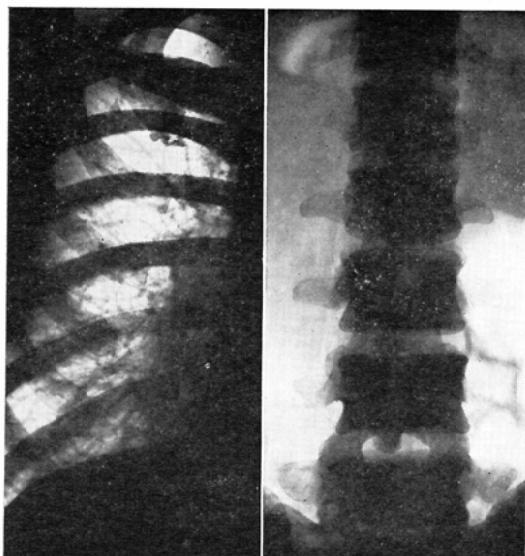


Photo. 1. 48 year old female Osteoplastic type: diffuse and homogeneous increased bone density with no structure.

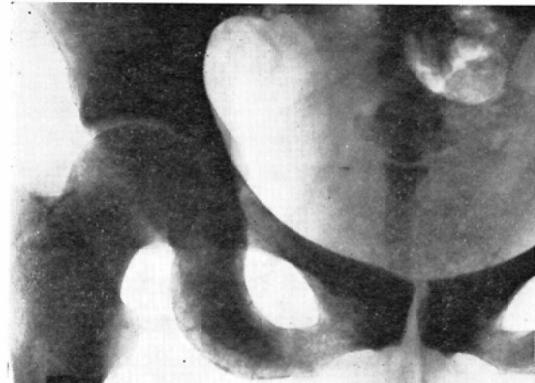


Photo. 2. same case as photo. 1. Osteoplastic type



Photo. 3. same case as photo. 2. After 9 months within the diffuse homogeneous density, fine flecks of osteolytic change are interspersed.

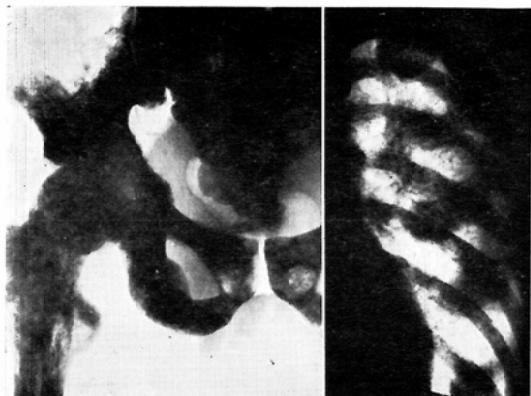


Photo. 4. 28 year old male Mixed type: mixture of osteoblastic and osteolytic type.

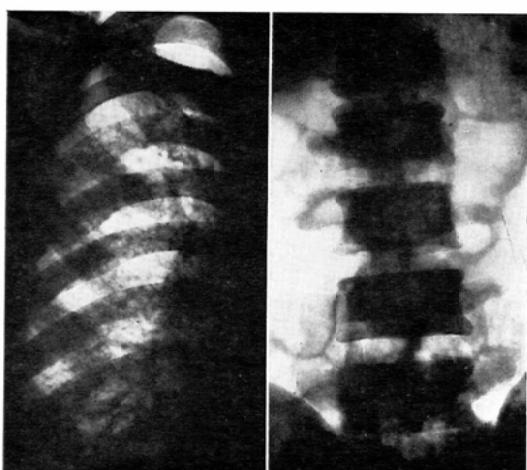


Photo. 5. 34 year old male Mixed type: same to photo. 4.

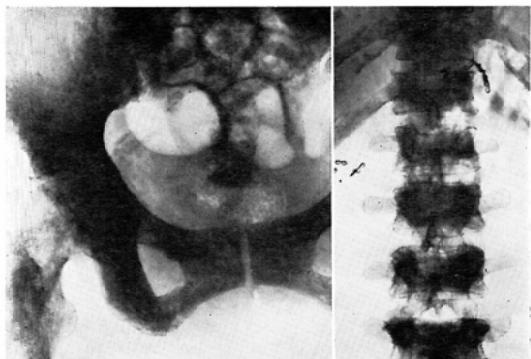


Photo. 6. 46 year old female Necrotic type: irregular densities with poorly defined border are found within osteolytic or atrophic bones.

As seen in Photo. 1, diffuse and homogeneous increase of bone density is noted giving an appearance of no structure. Since no periosteal hyperostosis is present, the contour of the bone shows no indentations. Within the diffuse homogeneous density, fine portions of osteolytic change are interspersed. The osteolytic portion may increase along with the course. (Photo. 2 to 3)

## 2. Osteolytic type

There is no pure osteolytic type. Extensive bone necrosis is usually found in osteolytic lesions.

## 3. Mixed type (case 1, 2, 7, 8)

This is a mixture of osteoblastic and osteolytic types, most frequently encountered. The osteoblastic portion appears as macular density, while osteolytic portion appears as circuloid or irregular area of translucency (Photo. 4, 5).

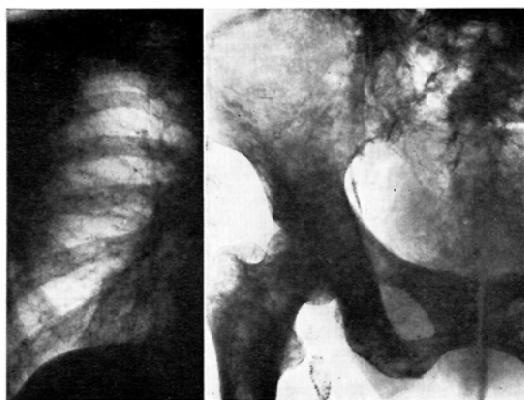


Photo. 7. 51 year old female Paget's disease type: irregular and coarse trabeculae of various sizes appear as in Paget's disease.

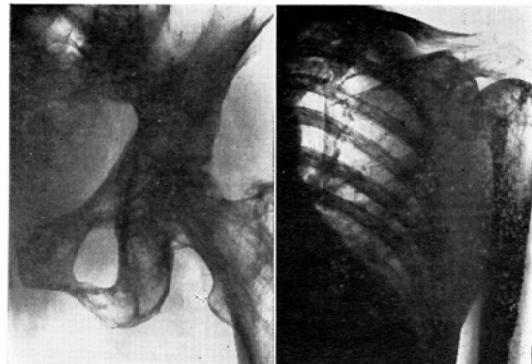


Photo. 8. 63 year old female Osteopathia striata type: shows several coarse trabeculae seen in osteopathia striata.

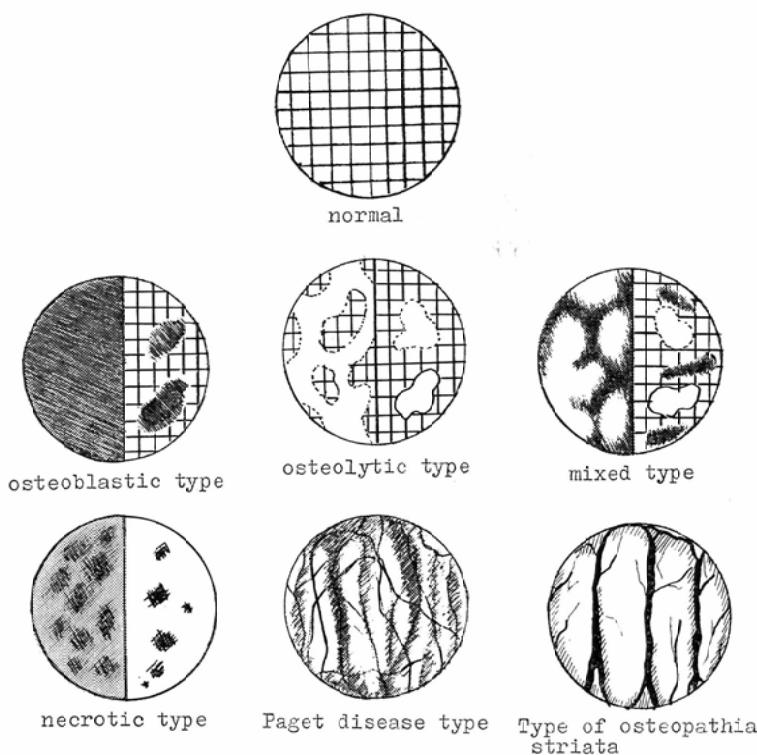


Fig. 2. Micro-and macroscopical bony diagram obtained from 1-6 X-ray findings.

#### 4. Necrotic form (Case 4, 14)

In general, irregular densities with poorly defined border are found within osteolytic or atrophic bones. The shape is not constant. These densities are characterized by the absence of internal struc-

ture (Photo. 6).

5. Paget disease type (Case 11, 12)

In a bone with relative atrophy, irregular, coarse trabeculae of various sizes appear as in Paget's disease. Normal trabecular structure is lost (Photo. 7).

6. Type of osteopathia striata (Case 10)

The bone consists of several coarse trabeculae seen in osteopathia striata (Photo. 8).

Fig. 2 shows a diagram of the slices of bone with these findings (1-6).

### Chest X-ray Findings

Most of the cases in our series were detected, utilizing chest X-ray film as the key. Chest X-ray findings are characterized by the followings.

1) Presence of bone changes described above in bony thorax.

2) Pulmonary metastasis was found in all cases. Tumorous appearance was rarely experienced.

The following findings are characteristic.

1) Extremely irregular increase of vascular markings.

2) Many fine flecks in the peripheral lung field.

### Conclusion

1) Bone carcinosis is the replacement of red marrow by cancer tissue.

2) Metastasis of gastric cancer is most frequently encountered, and females below the age of 40 are commonly affected.

3) Pain is intense and general symptoms are mainly seen.

4) Leukemoid reaction is seen in high proportions.

5) Unlike metastasis in general, osteoblastic elements are predominant. Bone necrosis is also frequent.

6) Rate of diagnosis during life is low.

7) Chest X-ray is important as the diagnostic key.

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