

**CALCIPHYLAXIS (CP) AND TUMORAL CALCINOSIS (TC) –
TWO RARE BUT SERIOUS COMPLICATIONS IN PATIENTS WITH SECONDARY
HYPERPARATHYROIDISM**

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QUESTIONS:

1. What is the estimated incidence of CP and TC in patients with chronic renal failure and secondary hyperparathyroidism?
2. Is there a role for parathyroidectomy in these patients, and if so, what should the extent of the parathyroidectomy be?
3. Is the life expectancy of patients with CP and TC shortened?

CLINICAL ASPECTS:

A 26-year-old white male presented to the emergency room with a fractured sternum following a sneeze! Because of severe pain and instability of the fracture, open reduction with screw fixation was performed. The patient was noted to have bilateral shoulder and elbow masses, which had been progressively enlarging over the past 18 months

(Figures 1, 2, 3, and 4)..



Fig. 1: Bilateral subcutaneous shoulder masses. Sternal scar from recent internal fixation.



Fig. 2: Right elbow mass.



Fig 3: Right shoulder mass



Fig. 4: Left shoulder mass

The patient was anephric and had been on hemodialysis for the past six years. His current serum calcium was 11.3 mg/dL (normal: 8.9-10.1) with a concomitant serum parathyroid hormone level of 62 pmol/L (normal: < 5.0). A diagnosis of severe secondary hyperparathyroidism with tumoral calcinosis was made and elective total parathyroidectomy advised in an attempt to control the progressive tumoral calcinosis.

At the time of parathyroidectomy, which was performed with intraoperative parathyroid hormone (PTH) monitoring, multiglandular, unequal parathyroid gland hyperplasia was found. His four parathyroid glands weighed 4700, 100, 390, and 180 mg respectively (normal < 4.0 mg). His PTH level dropped to < 0.2 pmol/L, which is, in essence, an undetectable level. He was started on lifelong calcium and vitamin D replacement.

Six months later, there had been a marked reduction (and softening) of his shoulder and elbow masses (Figure 5). Twenty months later, a paradoxical decrease in size of the right shoulder mass (Figure 6) coupled with a dramatic increase in size of the left shoulder mass (Figure 7) had occurred. Because of localized discomfort, the left shoulder mass was excised.

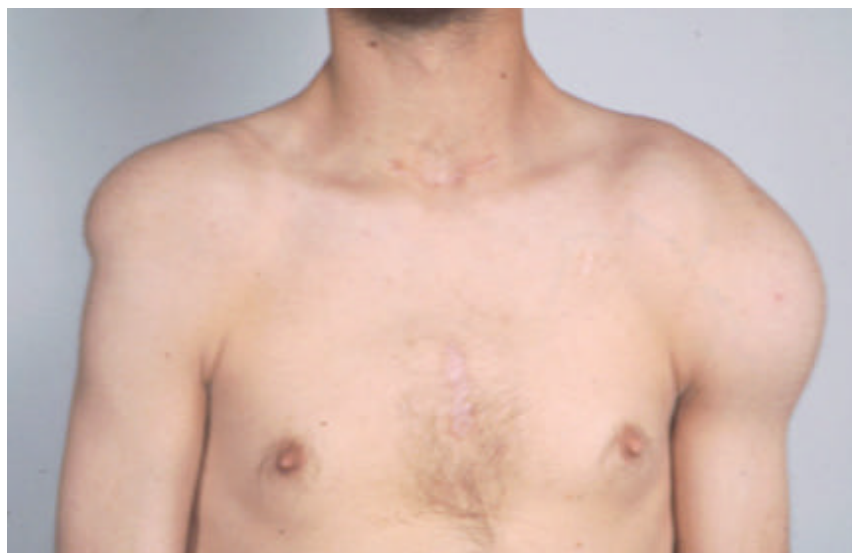


Fig. 5: Marked diminishment of both shoulder masses, right more than left.



Fig. 6: Decrease in size of right shoulder mass.



Fig. 7: Marked increase in size of left shoulder mass.

Gross appearance and histology are shown in Figures 8A, B, and C.

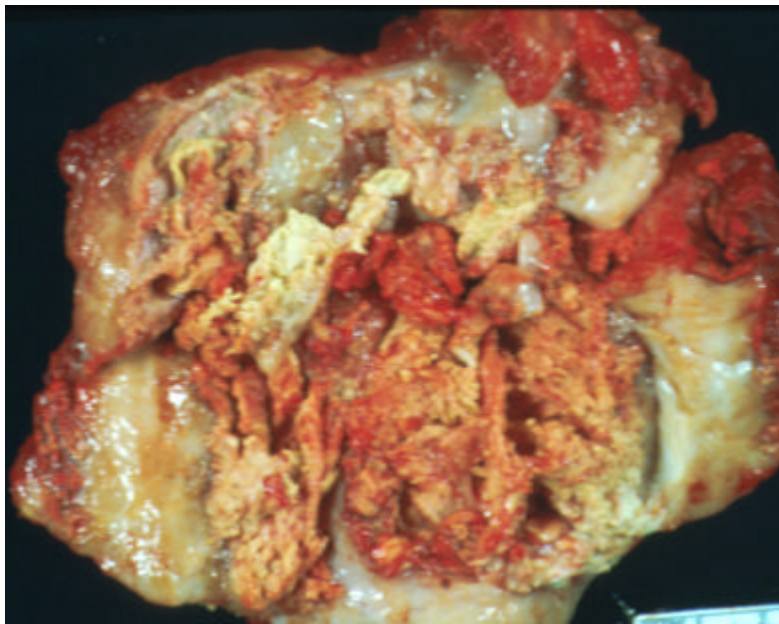


Fig. 18A: Multinodular appearance of calcified nodules admixed with the soft tissue.

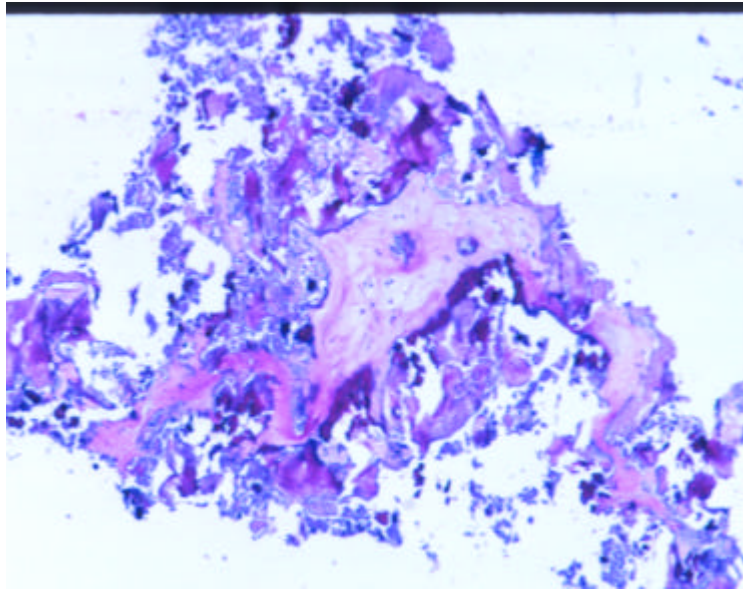


Fig. 18B: Low power view of H&E section showing extensive calcifications in a background of fibrous tissue.

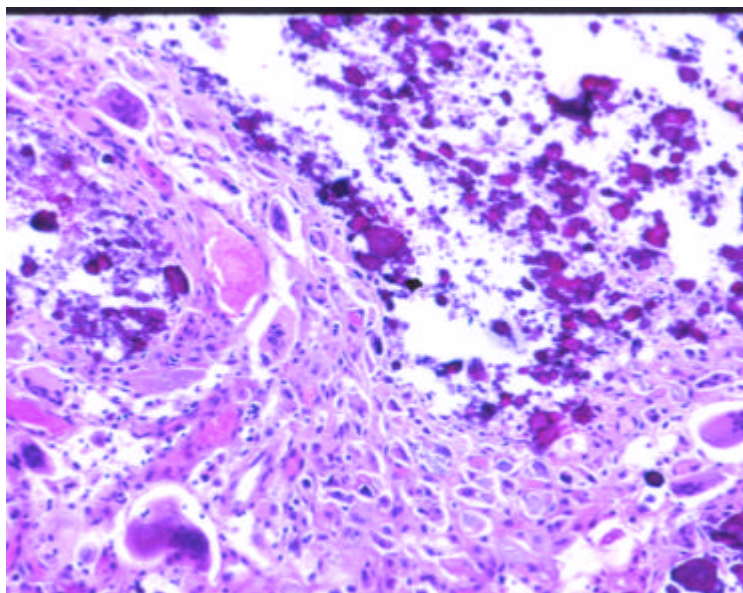


Fig. 18C: Higher magnification of H&E section with areas of fibrosis and multiple foci of calcification.

DATA SUMMARY:

Approximately 1% of patients who are on chronic hemo- or peritoneal dialysis may develop subcutaneous calcium deposition. The most common form of this deposition is termed calciphylaxis and is characterized by advancing cutaneous gangrene with extremely painful skin ulceration that may involve either the trunk or the extremities (Figure 9A and 9B).



Fig. 9A and B: Necrotic and secondarily infected, painful extremity lesions.

The pathogenesis of CP and TC are poorly understood but are thought to be due to a calcium/phosphorus metabolism abnormality as suggested by the histological findings of intravascular calcium deposition with medial calcification and intimal hyperplasia of subcutaneous or digital arteries. It has been suggested that a calcium-phosphorus product greater

than 70 predisposes to calcium deposition, as does (albeit rarely) a deficiency of either protein C or S.

Controversy exists regarding appropriate treatment of these rare complications.

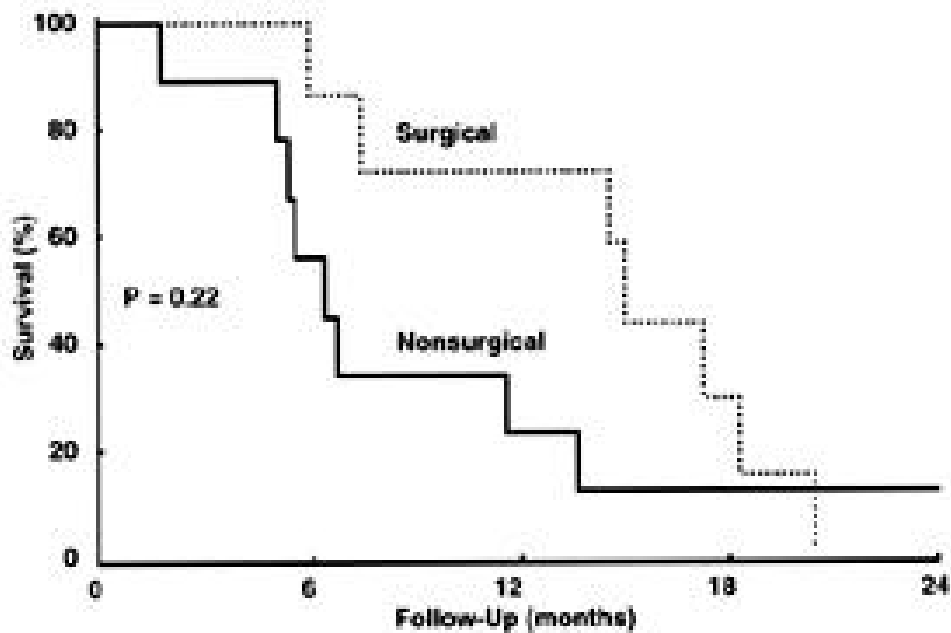
Treatment options available are:

- 1) Local wound care with judicious local excision for TC as exemplified in our index patient;
- 2) Control of secondary hyperparathyroidism by a low phosphorus diet, phosphate binders, and Calcitriol administration, i.e. medical treatment;
- 3) Total parathyroidectomy without parathyroid autotransplantation, i.e. surgical treatment.

This option should be entertained in those patients with painful lesions, those with PTH levels > 20 pmol/L, and in those with a calcium-phosphorus product consistently above 70 and which cannot be reduced by medical manipulation.

ANSWERS:

1. The estimated incidence of CP and TC in patients with chronic renal failure and secondary hyperparathyroidism ranges from 1 to 4.1%.
2. A role for parathyroidectomy in these patients is suggested but is not proven. In our experience when comparing seven patients with CP undergoing parathyroidectomy (which should be total without autotransplantation) to nine CP patients not undergoing parathyroidectomy, the surgically treated group trended towards an improved survival (Figure 10).



3. The life expectancy – patients with CP in particular, is markedly shortened regardless of therapy choices. The mean survival in a recent group of patients treated by us was a paltry 9.4 months.

REFERENCES:

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Angelis M, Wong LL, Myers SA, Wong LM. Calciphylaxis in patients on hemodialysis: A prevalence study. *Surgery* 1997; 122:1083-1089.

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“The greater danger for most of us is not that our aim is too high
and we miss it, but it is too low and we reach it.”

Michelangelo