MEDICAL GRAND ROUNDS PARKLAND MEMORIAL HOSPITAL

10 NOVEMBER 1966

H Y P O P A R A T H Y R O I D I S M

Case 1, [redacted] - Permanent hypoparathyroidism following thyroidectomy

This 57 year old [redacted] female was admitted to [redacted] for the first time from the county jail where she experienced a generalized seizure. Several days prior to entry the patient had been found in a confused state wandering the streets. She was taken to the County jail where she was being "investigated for lunacy". Shortly after arriving in the emergency room, the patient experienced another seizure characterized by tonic and clonic jerking movements of the upper extremities and head with biting of her tongue. There was no urinary or fecal incontinence, and an absence of post ictal state.

No past medical history was available. The pertinent findings on physical examination included the following. BP 158/78 P74 regular R 16 T98 Bilateral proptosis and aphakia were present. The fundi showed multiple small old exudates along the inferior temporal vessels. Bilateral firm non tender masses were present in the submandibular area. The PMI was 2 cms. outside the midclavicular line. A grade iii/vi holosystolic murmur was present at the apex. Motor and sensory function was grossly intact. No abnormal reflexes were present.

The laboratory tests revealed a serum Na 129 mEq/L, Cl 87 mEq/L, CO_2 28 mEq/L, and K 2.8 mEq/L. The cerebrospinal fluid contained 12 lymphocytes with normal protein and glucose concentrations. The heart was enlarged by Xray and the ECG showed evidence of left ventricular hypertrophy with a QT interval of 0.60 secs.

The patient was initially treated with diphenylhydantoin, phenobarbital, and intravenous saline containing vitamins and thiamine. Further saline solutions contained 40 mEq KCl and 20 ml calcium gluconate (180 mgs. Ca^{++}). The following day the laboratory reported a serum calcium value of 4.5 mgs/100 mls. The serum phosphorous was 4.9 mgs/100 mls.

On the third hospital day the patient's husband, alarmed by the failure of his wife to return to her home in Louisiana from a trip, provided additional medical history. Fifteen years ago the patient had undergone a thyroidectomy followed by three seizures. Since that time she had been taking "calcium pills", however, she had been known to stop her medications on other occasions. Lethargy and constipation usually followed but no other seizures had occurred.

Case 2, [redacted] - Transient hypoparathyroidism following thyroidectomy

This 26 year old [redacted] female gravida IV Para IV was found to have a 1 cm. palpable nodule in the left lower lobe of the thyroid. She was free of all symptoms of hyperthyroidism. The PBI was 5.7 µgms%. The I^{131} uptake was 14.5% and scan of the gland revealed a "cold" area in the region of the palpable nodule. The patient's neck was explored at surgery and during the operation a frozen section of the tissue was reported showing papillary adenocarcinoma. A total thyroidectomy was performed; the pathology report listed mixed papillary and follicular cystadenocarcinoma, Grade I, and two normal parathyroid glands. Approximately 18 hours following the operation the patient complained of drawing sensation in her hands and found to have positive Chvostek and Trousseau signs. She was given Vitamin D 100,000 units and calcium gluconate 8 grams daily. Over the next week the symptoms of hypocalcemia abated and the patient was discharged. Three months later, no longer taking Vitamin D or exogenous calcium, the patient maintains a normal serum calcium value and free of tetany.

DATE	[redacted]		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
SERUM CALCIUM (mgs/100 mls.)	9.7	OPERATION	7.0	6.6	8.5	9.2	9.8	9.6	9.5
SERUM PHOSPHOROUS (mgs/100 mls.)	4.2		4.5		4.5	4.9	7.5	4.3	4.2

Case 3, [redacted] - Hypoparathyroidism following parathyroidectomy

This 19 year old WF was referred to [redacted] because of vaginal bleeding occurring during the sixth month of pregnancy. She had been found to have a palpable mass in the area of the right upper pole of the thyroid in association with a serum calcium of 15 mgs per 100 mls. and a serum phosphorous of 3.1 mgs per 100 mls. Repeat calcium and phosphorous determinations strongly suggested hyperparathyroidism. A 15 gram parathyroid adenoma was removed at surgery. Within 12 hours of the completion of the operation the patient developed regular uterine contractions and spontaneously delivered a dead male fetus. By the tenth postoperative day the serum calcium had fallen to 6.4 mgs per 100 mls; the CO_2 combining power was 13.0 mEq/L. A positive Chvostek sign was elicited and the patient placed on calcium lactate 2.4 gms four times daily. Vitamin D, 100,000 units daily was added to the regimen and the patient was discharged.

The patient was readmitted to the hospital four days following discharge, because of weakness. She had failed to continue her calcium and Vitamin D supplements. Once again she was found to be hypocalcemic, and was treated with calcium lactate and Vitamin D. As far as is known the patient still requires medication to prevent hypocalcemic symptoms.

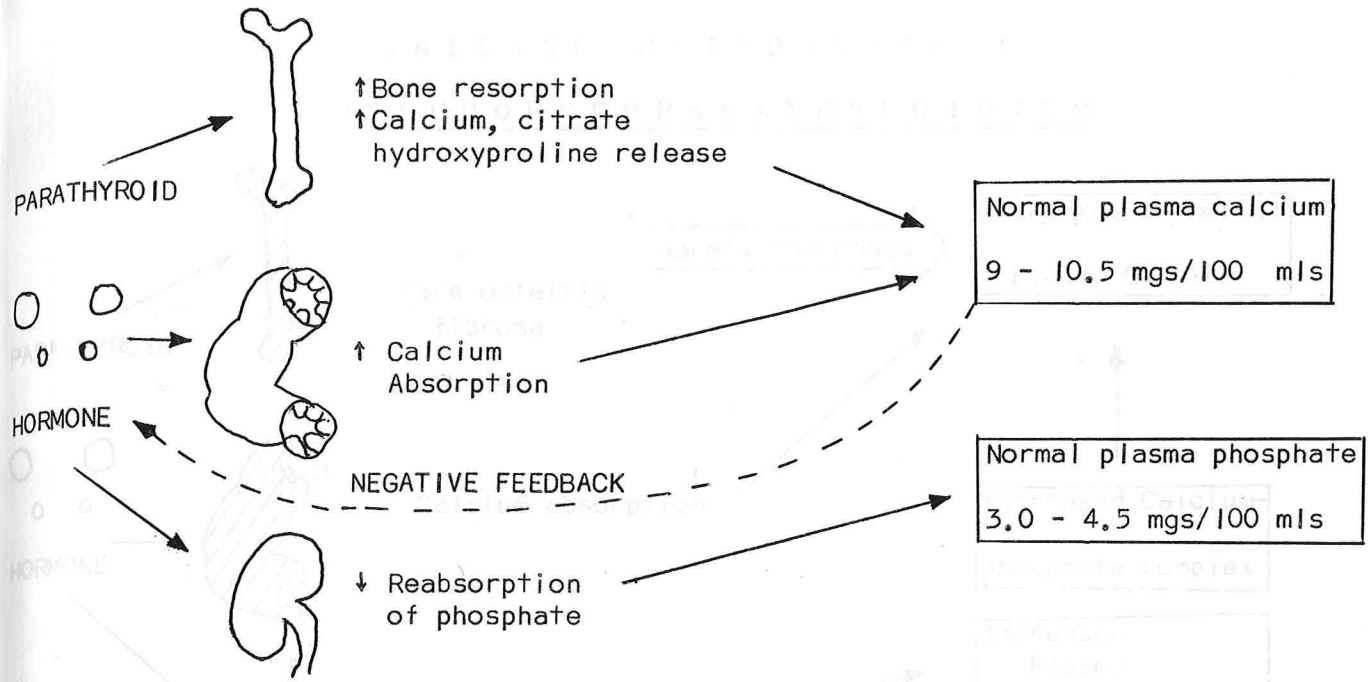
DATE	[redacted]	[redacted]		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
SERUM CALCIUM (mgs/100 mls.)	18.7	17.2	OPERATION	14.4	10.0	10.1	9.0	8.9	6.8	6.4
SERUM PHOSPHOROUS (mgs/100 mls.)	3.2	2.6		2.1		2.9	2.8		3.3	
ALK. PHOSPHATASE				9.2	14.2	16.3				26.0

DATE	[redacted]	[redacted]		[redacted]		[redacted]	[redacted]		[redacted]	[redacted]
SERUM CALCIUM	7.7	7.2		7.4	DISCHARGE	5.5	6.4		7.8	8.4
SERUM PHOSPHOROUS	3.2						3.3			
CALCIUM LACTATE (gms/day)	9.6	14.4		14.4			14.4			
VITAMIN D		100,000		100,000			150,000			

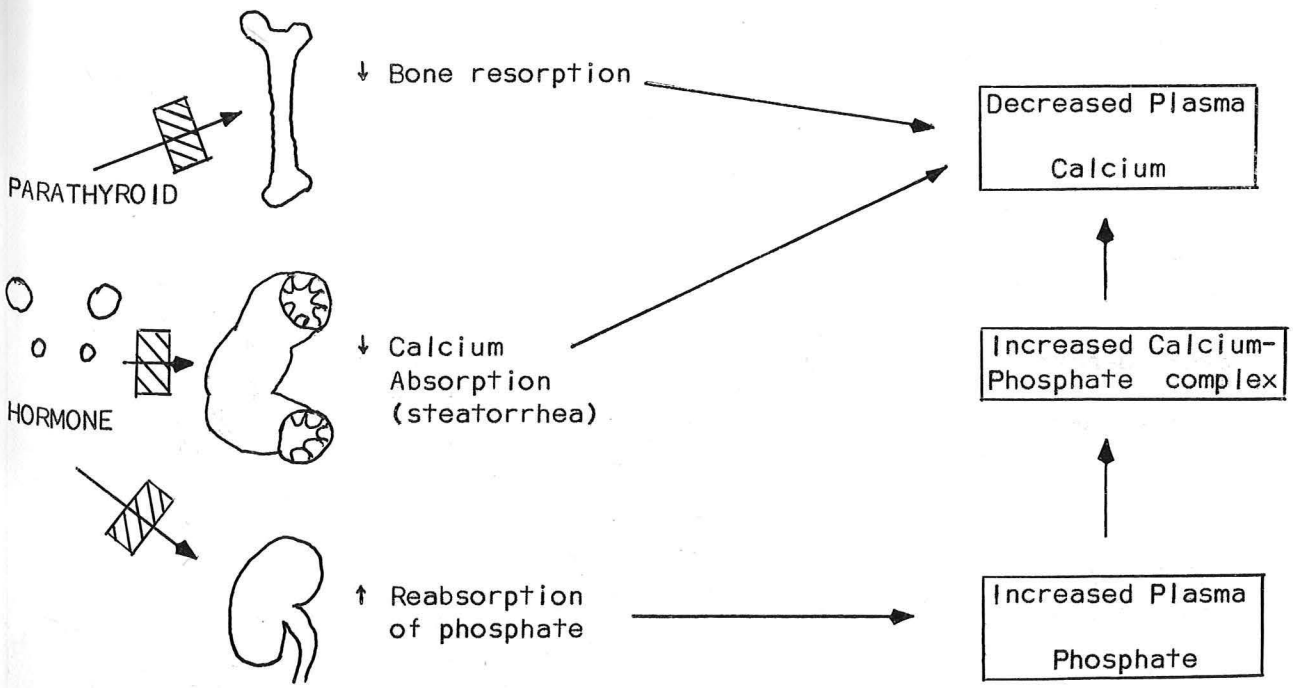
Case 4, [redacted] - Idiopathic Hypoparathyroidism

This 34 year old WM entered the [redacted] for the first time for evaluation of a convulsive disorder first documented three years prior to this admission. During this interval the patient had been hospitalized on eight occasions because of anxiety and convulsions. On the third hospitalization a diagnosis of idiopathic hypoparathyroidism was made on the basis of the physical findings, repeated generalized convulsions with basal ganglia calcifications, hypocalcemia and hyperphosphatemia. The patient was of short stature with small hands but a normal facial configuration. He demonstrated hypoplasia of the enamel of the teeth with several blunted dental roots. Positive Chvostek and Trousseau signs were present. An Ellsworth-Howard test was performed and interpreted as negative; however, since a positive control was not done, one can not be certain of the potency of that particular preparation of parathyroid extract. In the ensuing hospitalizations there was diagnostic confusion as to whether the patient had idiopathic or pseudo hypoparathyroidism. For the past two years the patient has been treated with calcium lactate and Vitamin D which corrects his hypocalcemia.

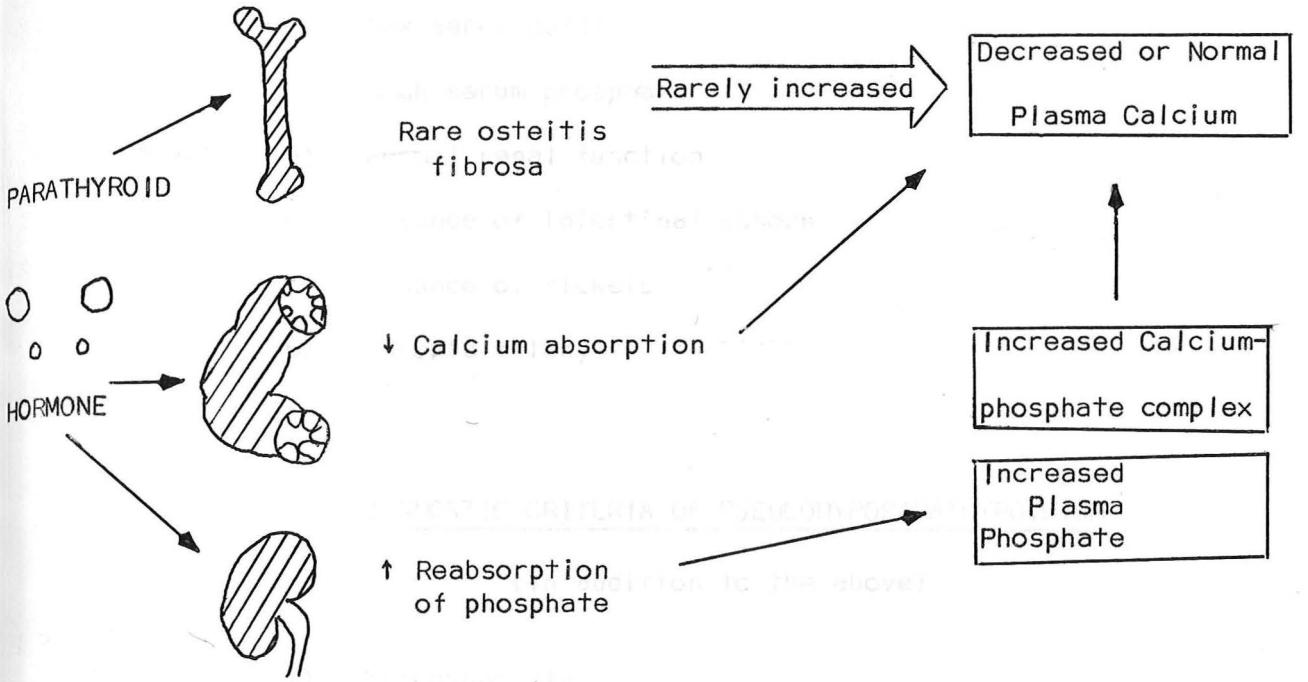
ACTIONS OF PARATHYROID HORMONE



CALCIUM METABOLISM IN THE ABSENCE OF PARATHYROID HORMONE



CALCIUM METABOLISM IN PSEUDOHYPOPARATHYROIDISM



DIAGNOSTIC CRITERIA OF HYPOPARATHYROIDISM

1) Low serum calcium
2) High serum phosphate
3) Normal renal function
4) Absence of intestinal absorptive defects
5) Absence of rickets
6) Chronic tetany

DIAGNOSTIC CRITERIA OF PSEUDOHYPOPARATHYROIDISM

(In addition to the above)

7) Brachydactyly
8) Round face and thickset figure
9) Resistance to the action of potent parathyroid hormone
10) Demonstrable presence of parathyroid gland tissue

ETIOLOGY OF BILATERAL BASAL GANGLIA CALCIFICATION

(Analysis of 88 Cases)

Idiopathic Hypoparathyroidism	56	64%
Pseudo Hypoparathyroidism		
Post Thyroidectomy Hypoparathyroidism	2	3%
Toxoplasmosis	5	6%
Familial idiopathic basal ganglia Calcification	6	7%
Miscellaneous diseases with normal Calcium-phosphorous metabolism	10	11%
No definite diagnosis	8	9%

ETIOLOGY OF PAPILLEDEMA IN HYPOPARATHYROIDISM

(Analysis of 22 cases)

Idiopathic Hypoparathyroidism	11	50%
Postopeperative Hypoparathyroidism	11	50%
Toxic Goiter	5	
Non-toxic Goiter	6	

CALCIUM AGENTS USED IN THE TREATMENT OF HYPOPARATHYROIDISM

Agent	Amount required to provide 1.0 gm. of calcium
Calcium citrate	4.7 gms
Calcium Lactate	7.7 gms
Calcium Gluconate	11.0 gms
Calcium Chloride	2.8 gms

EDTA TEST OF PARATHYROID INSUFFICIENCY

1. Patient placed on a 160 mgs calcium diet one day prior to the test.

2. On the day of the test between 10:00 a.m. and noon, Na EDTA (70 mgs/Kg) is infused in 500 ml of 5% dextrose in water containing 20 ml of 2% procaine hydrochloride.

3. Blood samples are taken without stasis at the start of the infusion and 2, 4, 8, 12, and 24 hours after its completion.

4. Serum calcium determinations should be done promptly.

INTERPRETATION

Normal: Serum calcium returns to pretest level within 24 hours.

Abnormal: Serum calcium fails to return to greater than 8.5 mgs% within 24 hours.

PHYSICAL SIGNS IN SPONTANEOUS HYPOPARATHYROIDISM

SIGN	IDIOPATHIC HYPOPARATHYROIDISM (50 Cases)	PSEUDO HYPOPARATHYROIDISM (40 Cases)
Body Habitus		
Round Face	5 (10%)	30 (75%)
Thickset, Stocky	5 (10%)	20 (50%)
Extremities		
Irregular length of metacarpals	1 (2%)	13 (33%)
Soft Tissue Calcification		
Subcutaneous	1 (2%)	23 (58%)
Basal ganglia	14 (28%)	19 (48%)
Ocular Signs		
Papilledema	9 (18%)	1 (2.5%)
Cataracts	24 (48%)	14 (35%)
Dental Signs		
Hypoplasia	3 (6%)	5 (12%)
Enamel defects	9 (18%)	4 (10%)
Unerupted teeth	9 (18%)	13 (33%)
Root defects	2 (4%)	7 (17%)
Ectodermal Changes		
Hair, Nails, Skin	26 (52%)	7 (17%)
Moniliasis	8 (16%)	0

HYPOPARATHYROIDISM	ONSET	PERCENT	RESPONSE TO EDTA TEST	SERUM CALCIUM	RESPONSE TO PARATHYROID HORMONE
Post operative					
Permanent	Widely	5.8%	Positive	Decreased	Positive
Partial	Variable (0-27 yrs)	24-28%	Positive	Normal	Positive
Post I^{131} Therapy	Unknown	10%	Positive	Normal	Positive
Partial					
Idiopathic	Average (17 yrs.)		-	Decreased	Positive
Pseudo	None after 20 years		-	Decreased	Negative
Pseudo-pseudo	-		-	Normal	Negative

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