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Interdisciplinary cohesion in managing a case of parathyroid adenoma – A case report

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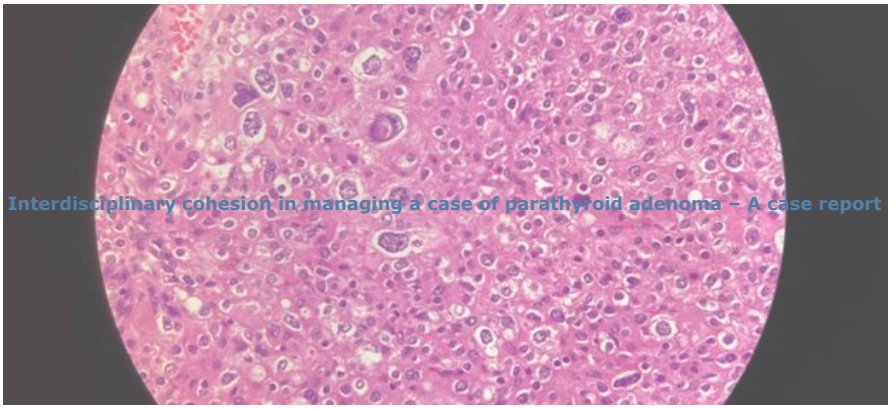

Abstract

Introduction: Interdisciplinary cohesion is indispensable in patient management. Exchange of scientific information between the various specialties of medicine paves the way forward to productive patient outcomes. We share an example of interdisciplinary cohesion in the management of a patient with parathyroid adenoma. Parathyroid adenoma is a benign neoplasm derived from parathyroid parenchymal cells. The parathyroid glands play a key role in calcium homeostasis. Parathyroid adenomas are responsible for hyperparathyroidism in 30 to 90 % of the cases [1]. Hyperparathyroidism can present with a multitude of symptoms. Some as innocuous as generalized weakness & some which may involve pain such as renal stones. Even psychiatric manifestations have been described in hyperparathyroidism. Hence a patient with hyperparathyroidism could seek the help of the various specialists in medicine ranging from endocrinologists to urologists. Cohesion, exchange of ideas & a patient centric approach is essential in management of such cases. The old adage 'too many cooks spoil the broth' is a reminder that conflict & exertion of superiority of one branch to another will not augur good for the patient. Our case report is an illustration of how teamwork and an interdisciplinary approach between different branches of medicine will stand the patient in good stead [2].

Case presentation: A 74-year-old man presented to the surgeon with nephrolithiasis, weakness & fatigue. An endocrinologist's opinion was sought. It came to light through radionuclide scan & parathormone (PTH) testing that the patient harboured a parathyroid adenoma. A diagnosis of primary hyperparathyroidism was established. The surgeon had planned for left lower parathyoidectomy in his hospital & testing for intraoperative PTH levels. A drop in the IOPTH > 50 % is considered as successful excision of the parathyroid glands [3,4,5]. However, the hospital laboratory did not have the facility to test of intraoperative PTH levels. The clinical team came in touch with the laboratory team of Apollo diagnostics. The reference laboratory of Apollo diagnostics was situated 20 km away from the location where the surgery was to take place. However, with meticulous planning & exchange of ideas, it was decided that the surgery be performed in the early hours of a Sunday morning. The early hours of Sunday were chosen to avoid the brunt of the city's traffic. The base line as well as IOPTH samples were transported to the testing facility by ambulance within an hours' time & the samples were tested after all the pre-requisites for sample testing such as QC checks were passed. The results were satisfactory as the drop in PTH level was > 50 % The excised glands were subjected to histopathological study & the diagnosis of parathyroid adenoma was confirmed.

Conclusion: Interdisciplinary participation in patient management is vital towards positive patient outcomes. Rapport & discussion between the various disciplines in medicine as well as the culture of 'putting the patient first' resulted in a positive outcome & successful management of the patient.

Keywords: *Intraoperative PTH (IOPTH), Parathyroid adenoma*

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Declaration

5.96% Plagiarism. Authors state no conflict of interest. Non Funded. The conducted research is not related to either human or animals use. All authors have accepted responsibility for the entire content of this manuscript and approved its submission.

Evidence in Context

What Know: We share an example of interdisciplinary cohesion in the management of a patient with parathyroid adenoma.
What New: The biochemical findings & histopathology findings confirmed a diagnosis of parathyroid adenoma in patient who presented with symptoms of primary hyperparathyroidism.

Introduction

Interdisciplinary cohesion is indispensable in patient management. Exchange of scientific information between the various specialties of medicine paves the way forward to productive patient outcomes. We share an example of interdisciplinary cohesion in the management of a patient with parathyroid adenoma. Parathyroid adenoma is a benign neoplasm derived from parathyroid parenchymal cells. The parathyroid glands play a key role in calcium homeostasis. Parathyroid adenomas are responsible for hyperparathyroidism in 30 to 90 % of the cases [1]. Hyperparathyroidism can present with a multitude of symptoms. Some as innocuous as generalized weakness & some which may involve pain such as renal stones. Even psychiatric manifestations have been described in hyperparathyroidism. Hence a patient with hyperparathyroidism could seek the help of various specialists in medicine ranging from endocrinologists to urologists. Cohesion, exchange of ideas & a patient centric approach is essential in management of such cases. The old adage 'too many cooks spoil broth' is a reminder that conflict & exertion of superiority of one branch to another will not augur good for patient. Our case report is an illustration of how teamwork and an interdisciplinary approach between different branches of medicine will stand patient in good stead [2].

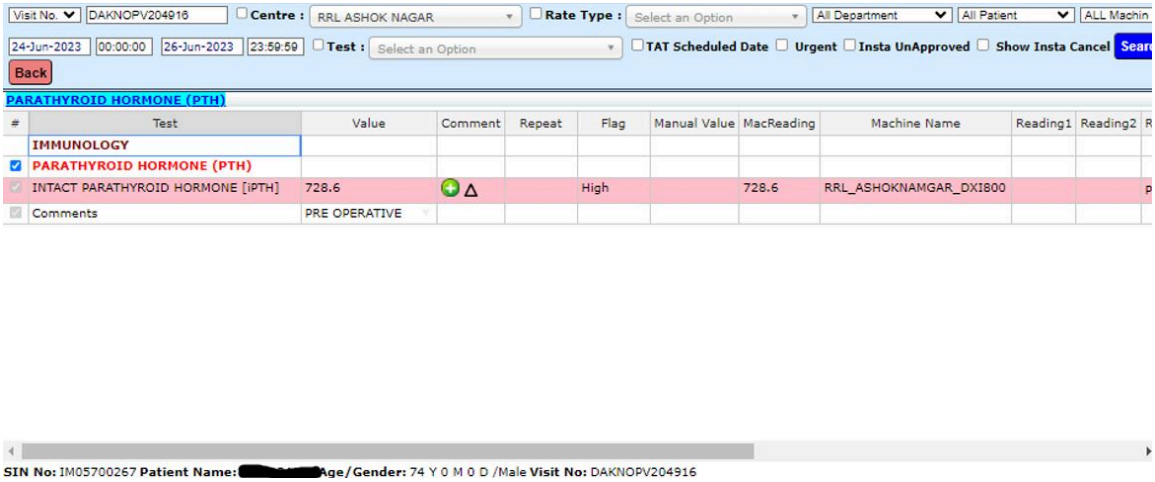
Case presentation

A 74-year-old man presented to the surgeon with nephrolithiasis, weakness & fatigue. An endocrinologist's opinion was sought. It came to light through radionuclide scan & parathormone (PTH) testing that the patient harboured a parathyroid adenoma. A diagnosis of primary hyperparathyroidism was established. The surgeon had planned for left lower parathyoidectomy in his hospital & testing for intraoperative PTH levels. A drop in the IOPTH > 50 % is considered as successful excision of the parathyroid glands [3,4,5]. However, the hospital laboratory did not have the facility to test of intraoperative PTH levels. The clinical team came in touch with the laboratory team of Apollo diagnostics. The reference laboratory of Apollo diagnostics was situated 20 km away from location where surgery was to take place.

However, with meticulous planning & exchange of ideas, it was decided that surgery be performed in the early hours of a Sunday morning. The early hours of Sunday were chosen to avoid the brunt of city's traffic. The base line as well as IOPTH samples were transported to the testing facility by ambulance within an hours' time & samples were tested after all the pre-requisites for sample testing such as QC checks were passed. The results were satisfactory as drop in PTH level was > 50 % The excised glands were subjected to histopathological study & the diagnosis of parathyroid adenoma was confirmed.

Discussion

Parathyroid adenomas are the commonest cause of primary hyperparathyroidism & account for 85 to 95 % of the cases [1,6]. Patients with parathyroid adenoma can present with bone disease, nephrolithiasis, gastrointestinal disturbances, central nervous system alterations & cardiac manifestations. Grossly, parathyroid adenomas tend to be located in the lower glands > upper glands & the same held true in our patient. However, despite many attempts the best imaging technique for localizing abnormal parathyroid tissue, the best "technique" for successful localization of abnormal parathyroid glands is an experienced surgeon. The patient on whom left lower parathyoidectomy was done presented with nephrolithiasis, weakness & fatigue. The radionuclide scan as well as PTH levels of the patient suggested primary hyperparathyroidism & the cause was ascribed to parathyroid adenoma. It is worth recalling that parathyroid adenomas are associated with MEN (multiple endocrine neoplasia) syndromes. Intraoperative estimation of PTH is termed "biochemical frozen section. The expertise of the biochemist cannot be understated & thorough scrutiny of pre-requisites such as quality control (QC), analyser maintenance & sample acceptability criteria were given due attention prior to the testing of the samples. On the basis of the Irvin criterion, an intraoperative PTH drop >50% from the highest either pre incision or pre excision level after parathyroid excision was considered a surgical success. Both baseline & intraoperative PTH samples were collected from the patient & were transported to the testing facility within 1 hour. The percentage difference between pre-operative & intraoperative PTH levels was 165 %, which satisfied Irvin criterion [1,5,6].



Picture 1: Pre-operative PTH levels as shown in the laboratory LIS

23-Jun-2023 | 00:00:00 | 27-Jun-2023 | 23:59:59 | Test : Select an Option | TAT Scheduled Date | Urgent | Insta UnApproved | Show Insta Cancel

PARATHYROID HORMONE (PTH)

Test	Value	Comment	Repeat	Flag	Manual Value	MacReading	Machine Name	Reading1	Reading2	Rea
IMMUNOLOGY										
PARATHYROID HORMONE (PTH)										
INTACT PARATHYROID HORMONE [iPTH]	69			Normal		69	RRL_ASHOKNAMGAR_DXI800			pg/
Comments	INTRA OPERATIVE									

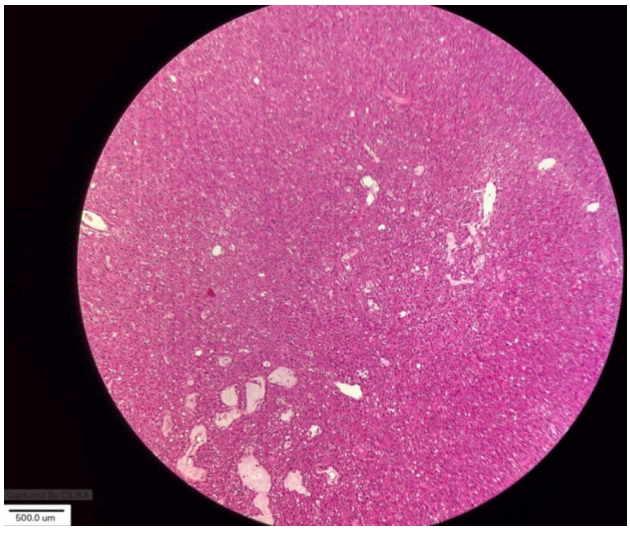
SIN No: IM05700269 Patient Name: [redacted] Age/Gender: 74 Y 0 M 0 D /Male Visit No: DAKNOPV204917

Picture 2: Intra-operative PTH levels as shown in the laboratory LIS

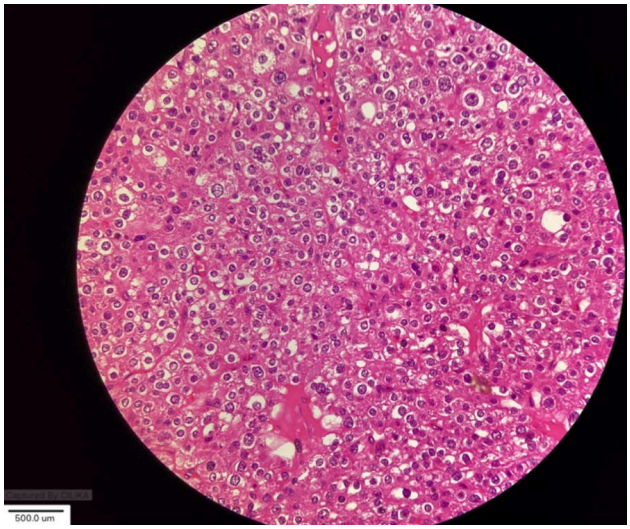
Histopathological examination

The left lower parathyroid gland received in the laboratory was weighed before cutting. The weight of the parathyroid gland was 3 grams. As given in literature the weight of the parathyroid rarely exceeds 1 gram if the underlying pathology is hyperplasia [9].

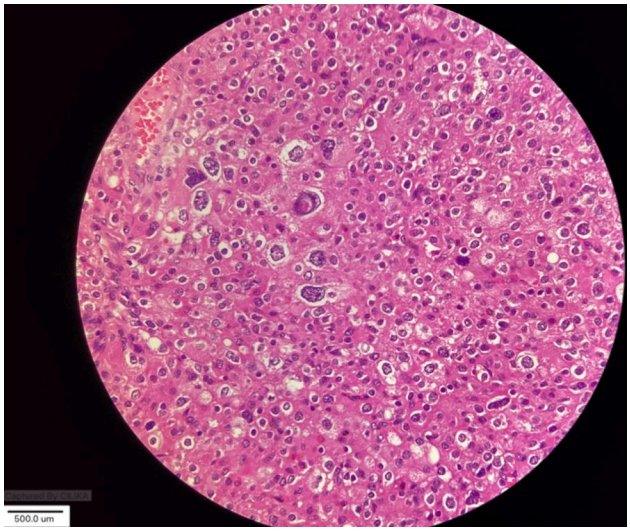
Gross image of the left lower parathyroid shows homogenous gray white surface & specks of congestion.



Photomicrograph (4X). Microscopic examination done on sections taken from the parathyroid revealed sheets of eosinophilic cells in an acinar pattern with interspersed delicate vessels on low power.



Photomicrograph (40X). Sections studied from the parathyroid showed sheets of polygonal cells with abundant cytoplasm, vesicular nuclei & 'salt & pepper' chromatin.



Photomicrograph (40 X). On higher power few areas showed cells with bizarre nuclei & binucleate cells. However, no necrosis or mitoses were noted.

As stromal fat is completely absent in parathyroid adenomas. Demonstration of the same by means of tissue frozen section is described in literature as a means of differentiating adenoma from hyperplasia.

However, risk incurred by not performing a frozen section was evaluated in this case. The surgeon & laboratory team concluded that documentation of IOPTH levels & routine histopathological examination would suffice in confirming a diagnosis of parathyroid adenoma [6,7,8]. The parathyroid glands received in laboratory after surgery had a discrete nodular appearance suggesting adenoma. On cutting, surface of parathyroid was homogenous gray white with areas of congestion. The gland was subjected to histopathological examination.

Parathyroid adenomas, grossly are well circumscribed tumours or encapsulated tumours oval tumours measuring 1 to 3 cm. Chief cells are the predominant cells in parathyroid adenomas, however other cell types can be present in varying mixtures. The presence of clusters of cells with bizarre nuclei is fairly common & does not indicate malignancy. Stromal fat is more often than not absent in parathyroid adenomas & is considered a diagnostic feature. Likewise, lymphocytic infiltration of the intervening stroma & occasional mitoses are common features in otherwise benign parathyroid adenomas [9].

A diffuse growth pattern is the most frequent type of architecture encountered, but follicular, nesting, or pseudo papillary patterns may be encountered. Though immunohistochemistry has been described as an ancillary tool to study parathyroid neoplasms further, it is seldom required. In our patient, the gross & microscopic findings did show characteristic features of parathyroid adenoma & the same correlated with the clinical as well as biochemical findings [10].

Conclusion

The biochemical findings & histopathology findings confirmed a diagnosis of parathyroid adenoma in patient who presented with symptoms of primary hyperparathyroidism. Interdisciplinary participation in patient management is vital towards positive patient outcomes. Rapport & discussion between the various disciplines in medicine as well as the culture of 'putting the patient first' resulted in a positive outcome & successful management of the patient.

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