Problem Solving Clinical Case Study

In this presentation, clinical history of a problem subject with diabetes is presented. The approach with regard to specific points in examination, laboratory investigations, diagnosis and management is elaborated.

The aim of this feature is to rationalize steps in the assessment of a problematic situation, make one think step by step, devise a practical approach in finding a solution for the clinical presentation, likely differential diagnosis and reason for following the line of management.

The contributing expert through this process offers his/her reasoning for the final diagnosis with supporting evidence from the literature.

This exercise is more for training in logistic dealing with a clinical situation, keeping in mind that commonly and the clinical approach should be based on this principle and that there is a rational approach for the investigative procedures.

The issues that are likely to be confronted will be :-

i. Degree of accuracy of clinical diagnosis.
ii. Extent of laboratory step wise tests required with application that are for diagnosis or be used in prognosis or follow-up or merely academic.
iii. Choice for line of management, keeping in mind costs involved and the likely side effects.

As diabetes mellitus is a multi-discipline disorder, involvement of related specialties with reference to diabetes expands scope of clinical problems. Thus insight as to interpretation of certain evaluation criteria for the functional status of different system is essential and incorporated in the series. The forum is to create interest for clinical problem-solving and evolve discussion on various clinical aspects as relevant to diabetes mellitus.

Case Study

A female aged 48 years presented with a history of diabetes of 12- year duration. She had been on diet and sulphonylurea therapy and kept fair control of diabetes till recently. For the past 3 months, she had become aware of some swelling of eyelids, especially more so in the mornings, exertional dysponea and increase in weight. Blood sugar values had been in the high range.

What further information would help in the assessment of the present health status?

There are three elements in his presentation.

i. Is the patient having secondary failure to sulphonlyurea? The uncontrolled hyperglycaemia is the cause for the present symptomatology.
ii. Is there possibility of incipient diabetic nephropathy ?
iii. Does the patient have hypothyroidism in addition to diabetes ?

What additional points in history can further elucidate the presenting problem?

Enquiry into osmotic symptoms may confirm the extent of hyperglycaemia.

For renal functional status, amount of urine passed in 24 hrs, history of dysuria. low grade fever, any associated gastro- intestinal symptoms, pruritus, prior record of high blood pressure may indicate renal involvement.

Questions on nature of exertional dysponea, history of chest pain, irregular heart beat may inidicate ischaemic heart disease.

Enquiry regarding history of lassitude, slowing down, skin or hair changes, cold intolerance or difficulty in remembering life events may point to hypothyroid state.

What specific points in physical examination may further elaborate this clinical presentation?

Have an access to any previous photograph, observe any changes in facial features.

Objectives weight gain.

Carry out complete systemic examination including vital signs like pulse rate, blood pressure.

In aaddition determine nature of skin, hair changes, if there is pitting oedema, and the nature of voice change, if any.

Palpate for thyroid gland, elicit reflexes and look for any delay in the relaxation phase.

In this patient, speech was slow. The patient had gained 5 kg in weight in the last 3 months. There was mild pallor, eyelids were puffy, ankles were oedematous. Pulse was 68/minute, and B.P. 155/95 mmHg. System review did not show any abnormality.

Thyroid gland was easily palpable and soft to firm in consistency. Ankle jerks were absent. Fundi showed background retinopathy.

Laboratory and biochemical evaluation revealed following results.
Hb-9.0g%

Fasting blood glucose -160 mg/dl

Postprandial blood glucose -220mg/dl
HbA_1c - 8.5%
Urine albumin- 2+, no deposit, culture sterile.
Serum creatinine- 2.5 mg/dl
Serum sodium - 4.5 mEq/l.
Serum potassium -4.5 mEq/l
ECG, LVH : X-ray chest, cardiomegaly present
T_3 -70ng% (110-220 ng%)
T_4 - 3.4ng%(4.5 -10.5 ng%)
TSH -10.2nIU/dl (00-4.5nIU/l)

What is the interpretation of these results ?

Does the patient have secondary failure to sulphonylurea? Is there incipient nephropathy ?

Is the patient in addition suffering from primary hypothyroidism ?

Criteria for secondary failure (FBS > 140 mg/dl; PP > 180mg/dl; HbA_1C > 8.5%; 'C' peptide, basal and 6 minutes following IV glucagon, rise < 1.0 mmol/l. (Ref Acta Diabetologia 1992; 29:20-4). all except last are present and so continued use of sulphonylurea, will not be desirable.

One needs to keep in mind that though the earlier first generation sulphonylurea (tolbutamide) was known to induce goitre and effect thyroid function (I_2 trapping), the same has not been observed for the second generation sulphonylureas

Patient has biochemical evidence for the renal involvement by virtue of significant albuminurea and raised serum creatinine.

Can this be further substantiated?

Creatinine clearance test (endogenous) is useful to evaluate the extent of renal functional impairment. It can provide prognosis on better grounds.

One needs to be reminded that in about 30% of cases with renal failure in diabetes mellitus, the cause is other than diabetes.

There is also scope for investigating this further by ultrasound and renal biopsy.

The patient should receive an ace inhibitor or calcium channel blocker and dietary instruction to control blood pressure and arrest progression of nephropathy. Changes in fundus need to be monitored further.

Are biochemical tests indicative of euthyroid sick syndrome (ESS), rather than primary hypothyroidism ?

Low T_3 value is observed in the euthyroid sick syndrome (ESS) while TSH should not show any rise. It is also contended that in the diagnosis of primary hypothyroidism, TSH should be > 20 uIu/dl. (Ref: Kaye TD., thyroid functions tests. Pstgraduate Medicine 1994;94:81-9.)

For academic purposes, TSH response will be very blunted in primary hypothyroidism while not so in euthyroid sick syndrome. This patient has been found to have ESS.

Association of diabetes especially IDDM with autoimmune thyroiditis is well recognized. In some clinics upto 30% IDDs also have thyroid dysfunction. With regard to NIDDM, association is less frequent.

Summarizing, female age 48 years who has been diabetic NIDDM for 12 years on sulphonylurea now has developed secondary failure to these drugs. She has in addition, nephropathy and renal decompensation as manifested by a rise in serum creatinine and rise in blood pressure. She requires measures for normalization of blood glucose, control of blood pressure and to slow down progression of renal failure. Fundi will have to be monitored at regular intervals. There is no primary thyroid failure in this case.

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