A Curious Case of Hyperbilirubinemia

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Abstract A 60-year-old patient suffering from easy fatigability was noted to have high total but normal conjugated bilirubin level though serum colour was pale. On further investigation the patient was found to be suffering from multiple myeloma and gamma globulin was possibly interfering with total bilirubin estimation.

Keywords Hyperbilirubinemia · Laboratory interference · Multiple myeloma · Paraprotein

Case Description

A 60 years old male, resident of western Uttar Pradesh presented to the Internal Medicine out patient department (OPD) services of PGIMER, Chandigarh with complaints of weakness and easy fatigability since last two months. On examination the patient was anemic and anicteric. No organomegaly was detected. The routine biochemical profile of the patient were as follows (Table 1). Biochemical assays were performed in Hitachi Modular P random access auto-analyzer using Roche kits. In view of high total bilirubin and normal direct bilirubin value with normal alkaline phosphatase (ALP) level, serum was observed in naked eye. Surprisingly the serum was pale in colour and there was no hemolysis. From the kit insert it was noted that bilirubin assay was modified to guard against interference with hemoglobin. The Bilirubin assay was repeated in Hitachi 902 using a Roche kit that did not

contain that modification. The results were as follows (Table 2).

Therefore there was an element of interference of total bilirubin estimation. As evident from biochemical profile the patient also had hyperglobulinemia and raised lactate dehydrogenase (LDH) levels which are consistent with gammopathy which are known to cause interference with several biochemical assays [1]. Therefore serum and urine electrophoresis were performed which demonstrated prominent M band. β_2 microglobulin and foot fat pad biopsy was performed to rule out other differential diagnosis. β_2 microglobulin level was within normal range and biopsy did not reveal any amyloid fibril in Polaroid microscope. To confirm the diagnosis of Multiple Myeloma bone marrow aspiration was performed which revealed 40% malignant plasma cells. Skull radiograph showed punched out lesion with typical crew cut appearance. Unfortunately the patient was lost in follow-up and exact nature of elevated gamma-globulin could not be established.

Discussion

As described in previous literature paraproteins are known to cause interference in the estimation of several biochemical parameters including total bilirubin, albumin, creatinine, phosphate, calcium and iron in human serum [2–8]. The falsely elevated serum bilirubin level is supposed to result from a white precipitate arising out of reaction of paraprotein with the solubilizing agent in total bilirubin reagent [2]. Though the finding was not found in all cases of paraproteinemia hence the exact cause of the interference remain obscure. This case highlights the need for naked eye examination of serum color in discordant cases of hyperbilirubinemia to rule out possible interference

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Table 1 Initial biochemical profile

Parameter	Result	Reference interval	Unit
Sodium	140	135–155	mEq/l
Potassium	4.5	3.5–5	mEq/l
Chloride	106	95–105	mEq/l
Urea	23	10–50	mg/dl
Creatinine	1.8	0.2–1.2	mg/dl
Total bilirubin	14	0.2–1	mg/dl
Direct bilirubin	0.02	0.1–0.4	mg/dl
Total protein	14	8–10	g/dl
Albumin	2	3.5–5	g/dl
Aspartate aminotransferase (AST)	45	2–40	U/l
Alanine aminotransferase (ALT)	50	2–40	U/l
ALP	120	120–320	U/l
LDH	640	240–480	U/l

Table 2 Results of repeat testing

Parameter	Result	Reference interval	Unit
Total bilirubin	0.8	0.2–1	mg/dl
Direct bilirubin	0.03	0.1–0.4	mg/dl

and to remain vigilant of possible interferences in gammopathies in biochemical assays. It is also customary to remember the possible interference of different biochemical parameters from paraproteins to avoid possible errors in patient management.

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