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Case Report

Biochemistry Section

Bisalbuminemia in a Hypothyroid Patient with Diabetes: A Case Report

JEEVAN K. SHETTY[1], RAVINDRA MARADI[2], KRISHNANANDA PRABHU[3], GOPALKRISHNA BHAT[4]

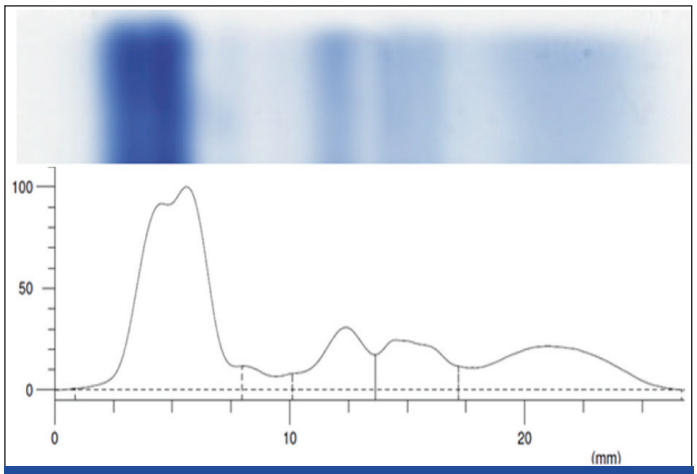
ABSTRACT

Bisalbuminemia is a rarely encountered anomaly characterized by presence of bifid albumin bands or a single widened albumin band in electrophoretogram. Inherited bisalbuminemia is quite rare and inherited as an autosomal dominant form. The acquired form of bisalbuminemia is usually transient and may be observed during long term beta lactam antibiotic therapy, acute pancreatitis, myeloma and nephrotic syndrome. This is a case of bisalbuminemia in 61-year-old diabetic female with hypothyroidism came with acute exacerbation of bronchial asthma.

Keywords: Bronchial asthma, Diabetes mellitus, Electrophoresis

CASE REPORT

A 61-year-old female was admitted to Kasturba Hospital Manipal with one week history of fever, cough and low backache. She was apparently doing well till one week before admission when suddenly she developed fever, which was insidious in onset and gradually progressive with intermittent high grade without chills or rigors. She also complained of dry cough since one week. This had progressed to severe cough with difficulty in breathing which was relieved by inhalers in two days. She also had a progressive back ache which gets aggravated by sitting and walking. She was a hypertensive for last 12 years and underwent thyroidectomy 12 years back. She also was diagnosed with diabetes mellitus and bronchitis since two years and was on regular treatment with oral hypoglycemic drugs and inhalers. On examination she was conscious, her vitals were stable, temperature 37.3°C, her BP and pulse was 150/100 mmHg, 80/ min respectively. No abnormality was observed in general physical examination other than presence of a thyroidectomy scar. On respiratory examination, she had bilateral rhonchi, cardiovascular system and abdominal examination does not reveal any abnormality. Laboratory reports Haemoglobin 12.4 g/dl, hematocrit 35.9%, platelets 402 x 10^3/µl, total WBC 10.2 x10^3/µl, neutrophils 62.3 %, lymphocytes 29.7 %, monocytes 5.9 %, basophils 0.6 %, urea 18 mg/dl, creatinine 0.6 g/dl, total cholesterol 233 mg/dl, triglycerides 213 mg/dl, HDL 34 mg/dl, LDL 156 mg/dl, FBS 139 mg/dl, PPBS 196 mg/dl, QBC malaria negative, AST, ALT, ALP, electrolytes, calcium and phosphorous – all within normal limits. TSH was elevated (8.08 µIU/ml), total protein 8.3g/dl with albumin to globulin ratio of 1.24, and elevated gamma globulin concentration (1.7 g/dl). Protein electrophoresis done using Helena semi-automated electrophoretic instrument with densitometer [Table/Fig-1] showed two distinct unequal albumin bands. Among the two band of albumin, slow moving and normal band concentrations were 43% and 57% of total albumin, respectively. She was empirically treated for acute exacerbation of bronchial asthma with antibiotics (azithromycin) and she improved and discharged with advice to follow up after one month.



[Table/Fig-1]: Agarose gel electrophoresis with densitometer scan showing two albumin bands

DISCUSSION

Bisalbuminemia is a rarely encountered anomaly characterized by presence of bifid albumin bands or a single widened albumin band in electrophoretogram. Bisalbuminemia is an inherited or acquired condition with a worldwide cumulative population frequency of 1:10000 to 1:1000 [1]. Inherited bisalbuminemia is quite rare and inherited as an autosomal dominant form. The acquired form of bisalbunemia is usually transient and may be observed during long term beta lactam antibiotic therapy, acute pancreatitis, myeloma and nephrotic syndrome. Although no adverse effects have been attributed some albumin variants may have an altered affinity for steroid hormones, thyroxine or drugs [2]. Incidence of bisalbuminemia has been reported in many conditions all over the world. Hereditary and acquired bisalbuminemia, in which the serum contains an albumin variant differing from albumin adult by single amino acid substitution have been reported in different races or ethnic groups [3]. About 77 mutations of albumin gene are known so far and 65 of them were result of bisalbuminemia [4]. The acquired form of bisalbuminemia has been found very commonly in patients receiving high doses of beta lactam antibiotics or suffering of pancreatic disease or complicated and ruptured pseudo cysts [5]. There are many reports worldwide with acquired transient bisalbuminemia in conditions such as diabetes mellitus, Waldenstroms's macroglobunemia, Alzheimer's disease, multiple myeloma, sarcoidosis, chronic kidney disease etc, [6]. Until now the only disorders which have been directly linked with the presence of congenital bisalbuminemia are familial dysalbuminemic hyperthyroxinemia (Arg 218AE His Arg 218AE pro mutations) and hypertriidothyrnimia (Leu66AE pro mutations). Although possibility that some physiologic or pharmacologic

substances may not bind to abnormal albumin variant as well as they bind to normal albumin variants as well as they bind to normal albumin should not be discounted [3] In Indian context, Dash et al., found 2 out of 1000 cases screened for bisalbuminemia in Punjabi population [7] Jamal et al., reported two cases of bisalbuminemia in 3000 consecutive electrophoresis in their lab and Simundic A, et al., found about 8 cases of bisalbuminemia in 6500 capillary electrophoresis [4,8].

We had observed bisalbuminemia in a man admitted with Alzheimer's disease [1]. In this case electrophoretic albumin fractions were unequal as explained by other studies [9]. Electrical mobility of two bands in albumin zone were different indicating either differences in molecular weight or chemical composition of these bands [1,4]. Bisalbuminemia were reported in patients with type II diabetes mellitus and respiratory infections [9]. This patient had no history of treatment with beta lactam antibiotics, pancreatic cyst, and no increase in serum alpha fetoprotein [9]. Biochemical parameters assessed did not correlate with any protein disorders which rules out the possibility of acquired bisalbuminemia [10].

CONCLUSION

Bisalbuminemia can be a congenital or acquired condition that in certain cases can point out the underlying disease and give a clue towards differential diagnosis. Although no adverse effects have been attributed bisalbumins, some variants may indicate an altered affinity for steroid hormones, thyroxine or drugs in such person. Study of bisalbuminemia might be of great interest and helpful in identifying the geographic distribution and plays a role in anthropology. Also, it is useful to familiarize the physicians and laboratory personnel with this entity.

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PARTICULARS OF CONTRIBUTORS:
1. Associate Professor, Department of Biochemistry, RAKCOMS, Rak Medical and Health Science University, Ras al Khaimah, UAE-11172.
2. Associate Professor, Department of Biochemistry, Kasturba Medical College Manipal, Manipal University, Karnataka, India.
3. Associate Professor, Department of Biochemistry, Kasturba Medical College Manipal, Manipal University, Karnataka, India.
4. Associate Professor, Department of Biochemistry, Kasturba Medical College Manipal, Manipal University, Karnataka, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Krishnananda Prabhu,
Associate Professor, Department of Biochemistry, Kasturba Medical College Manipal,
Manipal University, Karnataka-576104, India.
E-mail: krishnakunj2000@yahoo.com

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