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Evaluation of an Immunofixation Selective Method for the Bence-Jones Proteinuria Identification

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EVALUATION OF AN IMMUNOFIXATION ELECTROPHORESIS SELECTIVE METHOD FOR THE BENCE-JONES PROTEINURIA IDENTIFICATION

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INTRODUCTION

BJP are highly predictive markers of malignant cell dyscrasia (monoclonal gammopathy) and other pathologies such as amyloidosis and light chain deposition disease. BJP may be found in urine as monomer, dimer, higher-molecular-weight fragments or as low-molecular-weight fragments of monoclonal κ or λ light chains.

Different studies state that all laboratories must be able to determine BJP about 1 mg/dL. Initially, every detectable amount of free light chains (FLC) must be considered as potentially positive BJ and has to be confirmed by immunofixation methodology.

Currently, values ranged between 0.5 and 1 mg/dL are being employed as discriminant values.

OBJECTIVE

Evaluation of an immunofixation method sensitivity for the determination and confirmation of BJP in three groups of population considered as: "Negative" (FLC concentration < 0.5 mg/dL), "Indeterminate" (FLC concentration = 0.5-1.5 mg/dL) and "Positive" (FLC concentration > 1.5 mg/dL).

From the results obtained, BJP incidence in Valencia city "Area 9" was evaluated.

METHODOLOGY

After quantification by selective immunoprecipitation of the FLC (using a BN-II nephelometer, Dade Behring), it was carried out the immunofixation electrophoresis for all the samples. All of them were analyzed by triplicate. It was employed specific FLC antiserum throughout.

Urine samples were concentrated according to New Scientific Company protocol.

DISCUSSION

Results obtained are sumarized in the table exposed below. As can be checked, among the 145 samples evaluated (all the patiens studied form June-2002 to January-2003), 85 were classified as "indeterminate" or "positive"; then they were considered as potentially positive BJ.

After immunofixation electrophoresis, only 21 samples were confirmed as truly positive BJ, any of them belonging to the "indeterminate group". One of the samples was considered as an anomalous and was not included in the statistics. The lowest FLC amount measured by nephelometry that proved to be positive BJ after immunofixation was close to 2.5 mg/dL (see Figure 1)

RESULTS

[FLC]	NEGATIVE [FLκ] and [FLλ] < 0.5 mg/dL	INDETERMINATE [FLκ] and [FLλ] = 0.5-1.5 mg/dL [FLκ] or [FLλ] = 0.5-1.5 mg/dL	POSITIVE [FLκ] and [FLλ] > 1.5 mg/dL [FLκ] or [FLλ] > 1.5 mg/dL
N	56	38	48
Confirmed BJP	0 (0 %)	0 (0%)	21 (41.2 %) (47.6 % κ, 52.4 % λ)
Lowest BJP Detected	-----	-----	2.38 mg/dL (λ Type)
BJP Incidence in Area 9 of Valencia City	14.6 %		

[FLC]: concentration of free light chain in urine, N: samples number, κ: samples with κ-free chain monoclonal increment, λ: samples with λ-free cahin monoclonal increment.

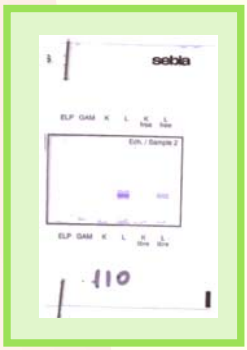
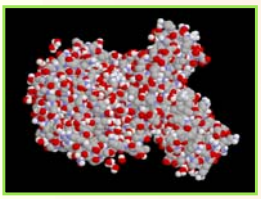


Figure 1. Immunofixation electrophoresis corresponding to the sample with lowest BJP detected ([FLλ] = 2.38 mg/dL)

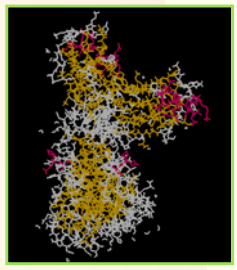
CONCLUSIONS

A sensitivity of 1.5 mg/dL is not enough to be used for screening. According to the population studied, an adequate discriminant value would be a FLC concentration equal or up to 2.5 mg/dL and always that a monoclonal increment is observed. Although the lack of sensitivity is usually associated to variable electrophoretic distribution of the FLC, the type of antiserum used and differences between colorants, it is necessary to evaluate other analytical steps (mainly sample concentration) in order to improve the sensitivity of the electrophoresis immunofixation methods.

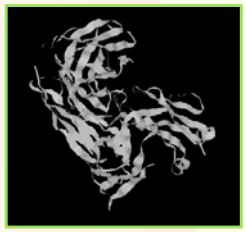
Taking into account the patients with suspected BJP, the incidence of this kind of proteinuria in the "Area 9" of Valencia City was close to 15%. Lambda-type BJP was the most frequently detected.



SPACEFILL PROTEIN



STICKS PROTEIN



RIBBONS PROTEIN

Differents looks of the protein

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