

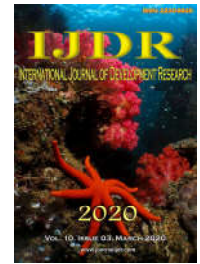


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RESEARCH ARTICLE

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PRESCRIPTION OF SERUM PROTEIN ELECTROPHORESIS: ON 77 TESTS CARRIED OUT AT HJRA BIOCHEMISTRY

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ABSTRACT

This study aims at evaluating the prescription of serum protein electrophoresis and at analysing the different electrophoretic profiles found in current practice at the biochemistry laboratory of the University Hospital Center of Joseph Ravoahangy Andrianavalona. This is a descriptive retrospective study over a period of 8 months from November 1, 2018 to June 30, 2019. All patients with serum protein electrophoresis prescription were included. In total, 77 serum protein electrophoresis were collected with 38 female and 39 male sera. The patients' age was from 1 to 82 years with an average age of 49 years and a sex ratio of 1.02. Out of the samples that were analyzed, 12.98% of the profiles were qualitatively and quantitatively normal. Monoclonal spikes were found in 9.1% of the cases. The departments which request it were external service (35.06%), rheumatology dermatology (14.30%) and oncology departments (6.49%). Electrophoresis gives a panoramic view of the whole serum proteins and can detect various pathologies. For a correct interpretation, the collaboration between clinician and biologist is always important.

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INTRODUCTION

Serum protein electrophoresis (SPE) is a practice test that involves the separation of serum proteins according to their electrical charge and size (Minville, 2018). This test is a panoramic reflection of the serum protein set (Albert, 2010 and Szymanowicz, 2006). The SPE provides information about the patient's physiological status, particularly nutritional condition, inflammatory status, or infectious status. It is also necessary for the monitoring of immunoglobulin abnormalities (Le Carrer, 1995). In clinical practice, this analysis has been designed primarily for the detection of gammopathies responsible for oligoclonal, monoclonal or polyclonal profiles.

The value of SPE is often neglected by clinicians and further studies on this examination deserve to be done in depth. Hence the objectives of this study, which consists of evaluating the prescription of serum protein electrophoresis and analysing the different electrophoretic profiles found in current practice at the biochemistry laboratory of the University Hospital Centre of Joseph Ravoahangy Andrianavalona.

MATERIALS AND METHODS

This is a descriptive retrospective study over a period of 8 months from November 1, 2018 to June 30, 2019. All patients with serum protein electrophoresis prescription were included.

Incomplete records were excluded from the study. The analytical steps consisted of the pre-analytical step, the analytical step and the post-analytical step. The pre-analytical step consists of venous sampling at the elbow crease on a dry tube. The patient does not have to fast. The sample is then centrifuged at 3000 rpm for 10 minutes. The analytical step consists of analysing the samples on the automate hydrasis®. Agarose gel electrophoresis was used. This is a method that consists of separating charged particles by migration under the action of an electric field. It consists of several steps. The sample is deposited in a buffer on the cathode side. This is followed by the application of a 200-volt current. The negatively charged proteins will migrate to the anode. The last 2 steps are fixation and staining. Finally, the post-analytical stage consists of interpreting the results of the SPE for each patient, the parameters studied were age, gender, services, clinical information and electrophoretic profiles. Data entry and processing were performed on XLstat software.

RESULTS

Over a period of 8 months, 77 SPE were collected with 38 female and 39 male sera. The patients' age was from 1 to 82 years with an average age of 49 years and a sex ratio of 1.02. As regards to the departments prescribing the SPE, after the external service, it was frequently prescribed by the Rheumato-Dermatology department with a proportion of 14.3% followed by the oncology department and the nephrology department at 6.49% (Figure 1).

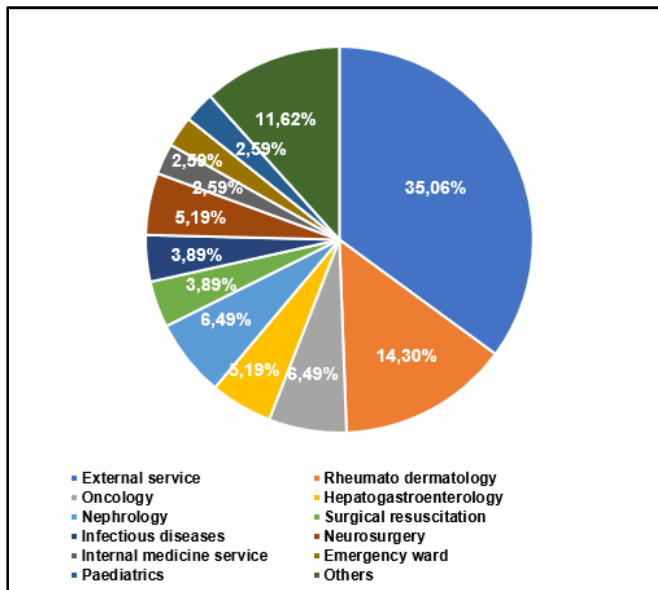


Figure 1. Breakdown of the population for this study as per the departments requesting the SPE

Based on clinical information, we have divided them into several categories. First, clinical information that does not follow recommendations represents 33.76%, after that, there is the clinical information that follows recommendations (29.87%). Finally, non-specific clinical information (11.68%) (Figure 2). Of the clinical information that followed the HAS recommendations, non-traumatic bone pain was the most common, accounting for 39.16 %, followed by multiple myeloma, anemia, and acute renal failure (Figure 3). For clinical information that was prescribed outside of the recommendations, the preoperative assessment was the most frequent and accounted for 17.39% of the SPE requests

followed by diarrhea, asthenia and hypertension (Figure 4). With regard to the electrophoretic profiles found, the normal profile was found in 13% of cases. For the pathological profiles, polyclonal hypergammaglobulinemia was the most observed (49.30%) lk. In addition, the monoclonal spike represented 9.10% of the results (Figure 5).

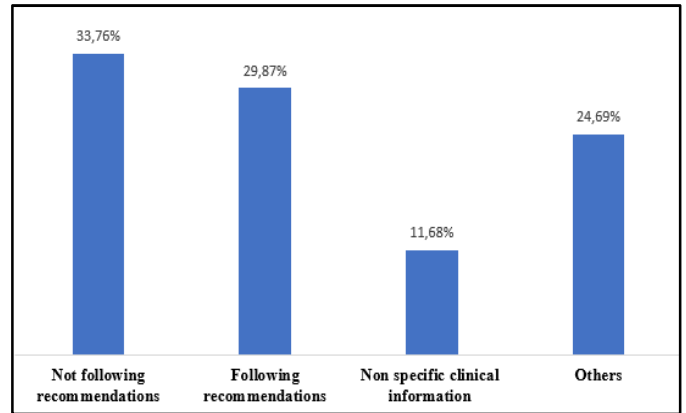


Figure 2. Breakdown of SPE requests as per the clinical information

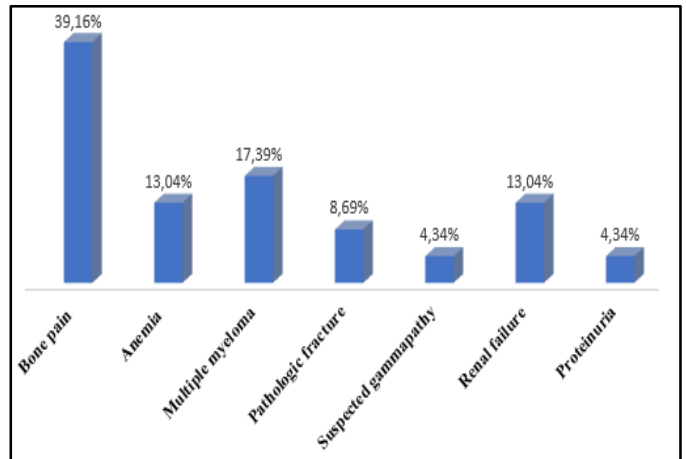


Figure 3. Breakdown of clinical information according to high authority of health criteria

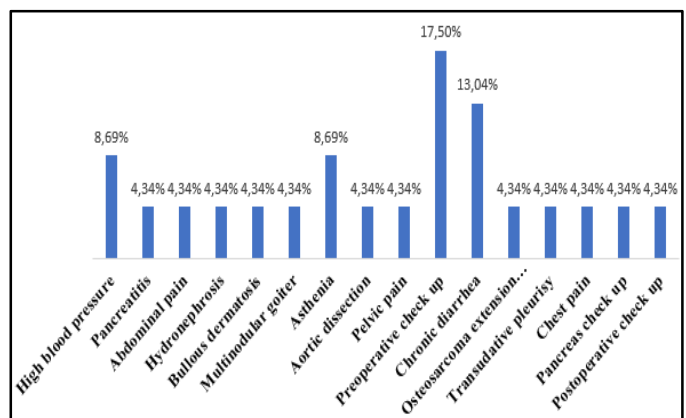


Figure 4. Breakdown of clinical information outside of recommendations

DISCUSSION

With regard to socio-demographic characteristics, Table 1 shows the comparison of the socio-demographic characteristics of our study with other studies. The number of men is

approximately the same as that of women. On the other hand, other studies have shown a women predominance (Minville, 2018 and Ouardia, 2019). The average age in our study is similar to that of Morocco.

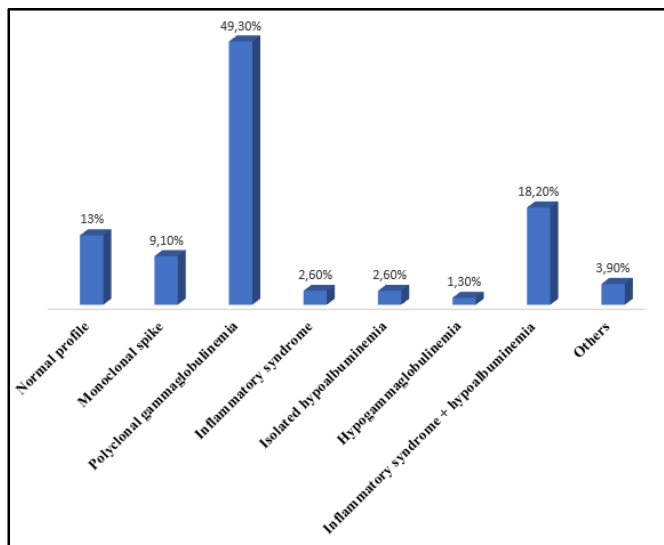


Figure 5. Breakdown of results according to electrophoretic profiles

Table 1. Comparison of the socio-demographic characteristics of our study with other studies

	Our Outcomes	Bordeaux [1]	Morocco [5]
Sexe ratio	1.2	0.52	0.70
Average age	49 years old	58 years old	49 years old
Extreme age	1 to 82 years old		1 to 91 years old

Table 2. Comparison of the requesting departments in our study with other studies

Requesting Departments	Our outcomes	Other Studies [5]
Rheumato-Dermatology	14.30%	32.4%
Internal medicine	2.59%	25.8%
Nephrology	6.49%	15.8%
Hepato-Gastro-Enterology	5.19%	6.8%

With regard to the requesting departments, Table 2 shows the comparison of the requesting departments in our study with other studies. The Rheumato-Dermatology department is the most concerned. This result is also similar to other studies (Ouardia, 2019). Regarding clinical information, only 29.8% of the prescriptions followed the recommendations of the National Authority for Health (HAS) (HAS, 2017). Several clinical informations were not identified in these studies such as adenopathy, splenomegaly, unexplained polyarthritis, unexplained peripheral neuropathy, hypercalcemia, vascular purpura and hyperviscosity syndrome. In addition, 33.7% of the requests based on clinical information were prescribed outside the HAS recommendations. Indeed, because of ignorance, clinicians routinely request SPE for any disease leading to over-prescribing. This systematic assessment is not recommended and clinicians should be trained and informed about the relevance and indication of SPE according to HAS recommendations. Regarding the study of protein profiles, we found 13% of normal profiles.

This result is comparable to another study that found 19.5% of normal profiles (Ouardia, 2019). Similarly, we found 9.1% of monoclonal spikes, similar to another study that found 7% (Ouardia, 2019). As for the monoclonal spikes, they all migrated into the gamma region. No spike was detected in the beta or alpha region. These results are different from the other studies. Indeed, one study showed 7% of monoclonal spikes, 72.5% of which were in the gamma region and 27.5% in the beta region (HAS, 2017). Similarly, another study showed 100 spikes, 87.5% of which were gamma spikes and 12.5% were beta spikes (Partouche, 2011). Finally, the most observed protein profile is polyclonal hypergammaglobulinemia. It is linked to various pathologies such as autoimmune diseases, liver diseases, viral infections, parasitic infections or bacterial infections (Tripathy, 2010). The present study highlighted the importance of SPE which is both qualitative and quantitative for the 6 protein fractions. This examination allows underlining various pathologies, in particular polyclonal hypergammaglobulinemia. The HAS recommendations on prescription is available to avoid systematic prescriptions outside the recommendations.

Conclusion

SEP gives a panoramic reflection of the whole serum proteins and can detect various pathologies. Polyclonal hypergammaglobulinemia have been the most observed. Because of ignorance, clinicians tend to prescribe SEP on a systematic basis for any disease. Thus, to train the clinicians on the recommendations for prescribing SEP is necessary. Similarly, for a correct interpretation, the collaboration between clinician-biologist is always important.

Conflictinterest: None.

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