

THE QUANTIFICATION OF SERUM FREE LIGHT CHAINS : THREE CASE REPORTS

Guis L.*, Diemert MC.*, Ghillani P.*, Choquet S.**, Leblond V.**, Vernant JP.**, Musset L.*

Immunology* and Haematology**, GH Pitié-Salpêtrière, 47-83 Bd de l'hôpital, 75651 Paris Cedex 13
(Presented at the AACC, Los Angeles, USA, 2004 (*Clin Chem* 2004, 50, No.6 Supplement F-38, pA183))

Introduction

The detection of immunoglobulin free light chains (FLC) is very important for the diagnosis and monitoring of patients with monoclonal gammopathies such as Primary Amyloidosis (AL), light chain Multiple Myeloma (MM), or Light Chain Deposition Disease (LCDD). However, FLC are often present in low concentrations and can frequently migrate into the beta-region. These factors can cause difficulties for the detection of monoclonal FLC by the usual methods such as Serum Protein Electrophoresis (SPE), immunofixation (IF), or immunoelectrophoresis (IEP), which are mainly qualitative. Recently, quantitative nephelometric assays for FLC in serum have become available and several studies suggest that these quantitative assays are more sensitive for FLC detection than conventional electrophoretic techniques.

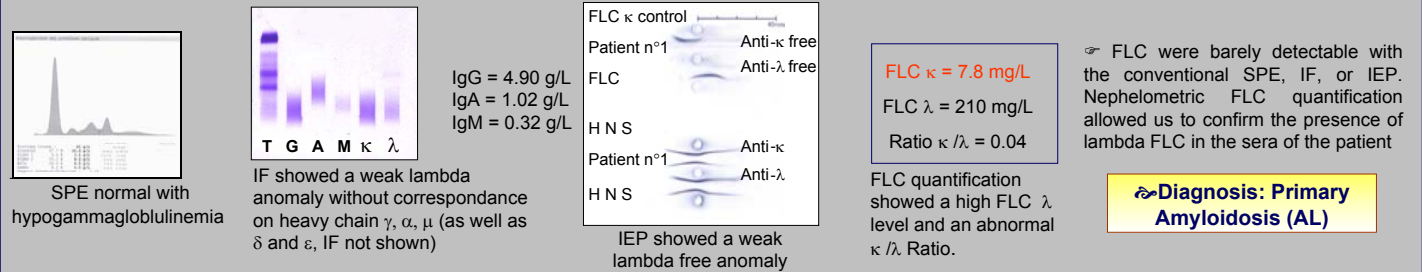
We report here our experience of three patients for whom FLC were either undetectable or barely detectable using the conventional qualitative assays.

Methods

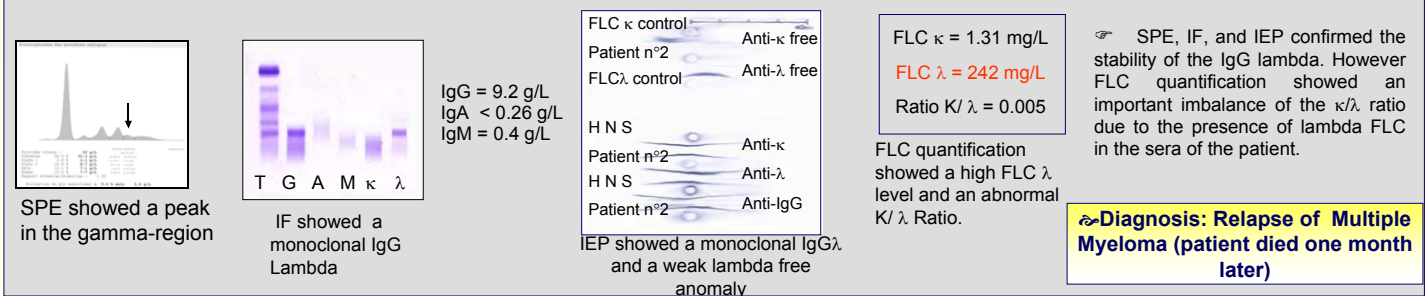
- ✓ Sera from three patients sent to the laboratory for monoclonal gammopathy investigations were assessed by SPE, IF and IEP.
- ✓ SPE were performed on agarose gels with a semi-automated HYDRASYS™ instrument (Sebia). Monoclonal components were identified by IF on the HYDRASYS™ instrument (Sebia) and by IEP (Helena), using specific antisera (anti-gamma, anti-alpha, anti-mu, anti-kappa free/bound and anti-lambda free/bound). For IEP, Human normal serum (HNS), kappa free and lambda free positive controls were used as reference materials.
- ✓ IgG, IgA and IgM were measured by nephelometry on a BNII nephelometer (Dade Behring).
- ✓ FLC were measured by a nephelometric assay: FREELITE™ (The Binding Site) on a BN™II nephelometer (Dade Behring). The normal ranges were :
 - ♦ FLC Kappa (κ) = 3.3 – 19.4 mg/L
 - ♦ FLC Lambda (λ) = 5.7 – 26.3 mg/L
 - ♦ K/λ Ratio = 0.26 – 1.65

Results

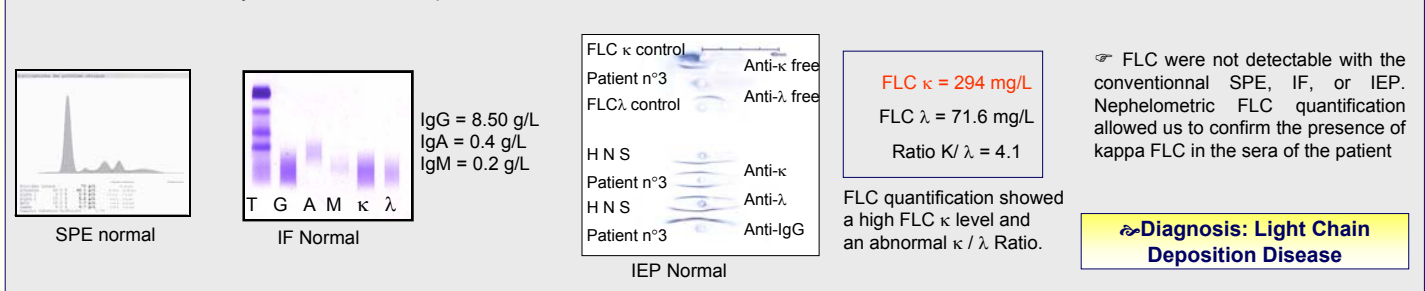
1 - Case n°1: A 40-year-old woman, with spontaneous bruises, asthenia, abdominal pains and a possible cardiomyopathy was investigated for suspicion of abdominal amyloidosis. Abdominal fat biopsy showed a Congo Red positivity. SPE, IF, IEP and FLC measurement were performed.



2 - Case n°2: A 56-year-old man was followed for a refractory multiple myeloma grade IIIB (Durie and Salmon classification); IgG lambda peak was 69 g/L at diagnosis. A bone marrow allo-graft was performed. SPE, IF, IEP were performed to follow the evolution of the myeloma and showed a stability of the IgG lambda (peak = 3.0 g/L). Three months after the allo-graft the patient was getting worse despite the apparent stability of the myeloma.



3 - Case n°3: A 66-year-old man was explored for asthenia, anemia and -----



Conclusion

- ✓ In patients with AL amyloidosis, multiple myeloma (especially light chain myeloma), and light chain deposition disease, the evaluation of the tumor mass is difficult and needs sensitive, specific and quantitative methods.
- ✓ For these three patients, FLC were not (case 3) or barely (cases 1 and 2) detectable with the conventional qualitative assays.
- ✓ For these samples, nephelometric assay of FLC gave greater sensitivity than conventional methods and allowed an accurate quantification of the kappa and lambda FLC.
- ✓ These three examples support that serum FLC assay (FREELITE™) appears to be a useful tool for the diagnosis and monitoring of patients with monoclonal gammopathies.