Immunofixation-quantitative Serum
SERUM, PROTEIN ELECTROPHORESIS
(Serum)

Investigation	Observed Value	Unit	Biological Reference Interval
Total Protein (Biuret)	**8.49**	g/dL	6.4-8.3
Serum Albumin	4.86	g/dL	3.57-5.42
Alpha 1 Globulin	0.27	g/dL	0.19-0.40
Alpha 2 Globulin	0.82	g/dL	0.45-0.96
Beta 1 Globulin	0.56	g/dL	0.30-0.59
Beta 2 Globulin	0.31	g/dL	0.20-0.53
Gamma Globulin	**1.66**	g/dL	0.71-1.54
Albumin, Globulin Ratio	1.34		1.1-2.2
"M" Band	Absent		Absent
Comment	MONOCLONAL BAND NOT SEEN		

Interpretation :

1. Serum protein electrophoresis is commonly used to identify multiple myeloma & related disorders.
2. Electrophoresis is a method of separating proteins based on their physical properties & the pattern is dependant on the fractions of 2 types of protein: Albumin & Globulin (alpha1, alpha2, beta & gamma).

Components	Compositions	Interferences
Albumin	Albumin	Lipoproteins, Drugs, Bilirubin, Radiological contrast
Alpha1 - globulins	α-1 antitrypsin, α-1 acid glycoprotein	-
Alpha2 - globulins	α-2 macroglobulin, haptoglobulin	Haptoglobin - haemoglobin complex
Beta globulins	Transferrin, β-lipoprotein, IgA, IgM & sometimes IgG with complement protein	Fibrinogen
Gamma globulins	IgG, IgA, IgM,IgD, IgE	CRP

Direct detection at 200 nm in capillaries yields relative concentrations (percentages) of individual protein zones.

Remarks :

1.The following conditions require serum immunofixation to differentiate monoclonal and polyclonal disorders.
(A) A well defined 'M' band (B) Faint band.
(C) Chronic inflammatory pattern (decreased Albumin, increased Alpha, increased Gamma region), which may mask the monoclonal band.
(D) Isolated increase in any region, with otherwise normal pattern.

2.Shouldering of albumin peak along anodal or cathodal side may be seen with lipoproteins, drugs, bilirubin or radiological contrast.

Associated Tests:- Cytogenetic markers for Prognostication of Multiple Myeloma is available (Multiple Myeloma by FISH Panel - IGH gene rearrangement [t(11;14),t(4;14),t(14;16)] translocations, monosomy 13/deletion 13q14, deletion 11q, deletion 17p, chromosome 1p/q deletion/amplification ploidy status for chromosome 5,9 and 15) at Metropolis Healthcare.

Dr. Sneha Shah
MD(Path)
Clinical Pathologist & Doctor in-charge Chemistry

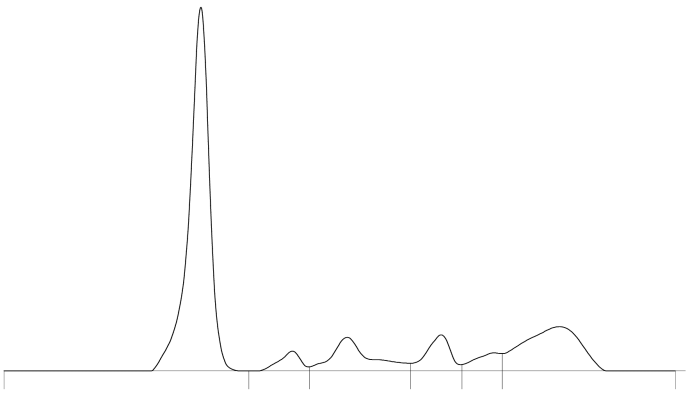
Investigation	Observed Value	Unit	Biological Reference Interval

METROPOLIS HEALTHCARE PVT LTD, MUMBAI

Serum Protein Electrophoresis

Name: **MADAN LAL**
ID : **118852655**
VID: **11187315336**
Age: **57** Yrs

Working date 06/18/2018
Sample num.: **19**
Sex: **M**



T.P : **8.49** g/dL

A/G Ratio : **1.34**

Electrophoresis

Fractions	%	Ref. %	g/dl	Ref. g/dl
Albumin	**57.3**	55.8 - 66.1	4.86	3.57 - 5.42
Alpha 1	**3.2**	2.9 - 4.9	0.27	0.19 - 0.40
Alpha 2	**9.7**	7.1 - 11.8	0.82	0.45 - 0.96
Beta 1	**6.6**	4.7 - 7.2	0.56	0.30 - 0.59
Beta 2	**3.7**	3.2 - 6.5	0.31	0.20 - 0.53
Gamma	**19.5**	11.1 - 18.8	1.66	0.71 - 1.54

Comment : **MONOCLONAL BAND NOT SEEN**

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Immunofixation- Qualitative, Serum

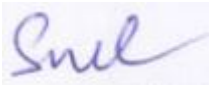
(Serum)

Investigation	Observed Value
Electrophoretic Zone	
IgG	ABSENT
IgM	ABSENT
IgA	ABSENT
Kappa	ABSENT
Lambda	ABSENT
M-Band	ABSENT
Impression	NO MONOCLONAL GAMMOPATHY SEEN

Interpretation:

Bands in serum protein electrophoresis	**Serum Immunofixation**		**Result**
	Anti heavy chain antisera (IgG/ IgM/IgA)	**Anti Light chain Kappa/Lambda**	
Remark 1 1 band present	+	+	Presence of monoclonal
Remark 2 1 band present	-	+	1.Light chain disease,suggest urine Immunofixation 2.IgD or IgE disease 3.Multiple bands in lambda region indicates polymerised form
Remark 3 1 band present	+	-	Heavy chain disease.
Remark 4 Faint band present	Faint band	-	Cryoglobulin
Remark 5 2 band present	2 band with same or different anti-heavy chain sera	2 band with same different anti-light chain sera	1. Biclonal gammopathy 2. Paraprotein monomer/polymer of Immunoglobulins).

Associated Tests: Cytogenetic markers for Prognostication of Multiple Myeloma is available (Multiple Myeloma by FISH Panel - IGH gene rearrangement [t(11;14),t(4;14),t(14;16)] translocations, monosomy 13/deletion 13q14, deletion 11q, deletion 17p, chromosome 1p/q deletion/amplification ploidy status for chromosome 5,9 and 15) at Metropolis Healthcare.



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Investigation	Observed Value	Unit	Biological Reference Interval
Immunofixation-quantitative Serum			
Immunoglobulin Profile IgG, IgM and IgA, Serum (Serum,Nephelometry)			
***IgG Total**	**1620.00**	mg/dL	700-1600
***IgA Total**	316.00	mg/dL	70-400
***IgM total**	86.00	mg/dL	40-230

Interpretation :

1. Decreased levels are seen in primary immunodeficiency conditions and in secondary immune insufficiencies like advanced malignant tumours, lymphatic leukemias, multiple myeloma and Waldenstrom`s disease.
2. Increased concentrations occur due to polyclonal or oligoclonal immunoglobulin proliferations seen in hepatic disease, acute/chronic infections and autoimmune disease.

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Immunofixation-quantitative Serum

Investigation	Observed Value	Unit	Biological Reference Interval
Kappa And Lambda-Freelite Serum (Serum)			
Free Kappa (Light Chain), Serum (Nephelometry)	**40.00**	mg/L	3.3-19.4
Free Lambda (Light Chain), Serum (Nephelometry)	**28.60**	mg/L	5.71-26.3
Free Kappa/ Lambda Ratio	1.40		0.26-1.65 In cases with renal impairment suggested reference interval :0.37 to 3.1

Interpretation:

1. Increased production of monoclonal immunoglobulins or free monoclonal light chains leads to a change in the k/lambda light chain quotient. A k/lambda quotient outside the reference interval is thus an indication of the existence of a monoclonal gammopathy.
2. Serum light chains are also dependent upon several factors like the type of clonality, presence of associated renal failure or polyclonal hypergammaglobulinaemia and thedegree of bone marrow impairment from the growing tumour or from drug therapy. These factors should be considered during interpretation .
3. Following are the recommendations as per the International Myeloma Working Group (IMWG)-: guidelines for serum free light chain analysis & interpretation in multiple myeloma and related disorders-

* Use of free light chain ratio (rFLC) in combination of serum protein electrophoresis & immunofixation for diagnosis
* Use of involved free light chain (iFLC) quantitation or the difference between the involved & uninvolved serum light chains (dFLC) for serial measurements during monitoring & to define complete response. During monitoring the ratio (rFLC) can be unreliable due to associated fluctuations in the concentration of uninvolved light chains and renal failure.

Reference: Hutchison et al, BMC Nephrology 2008

Immunofixation-quantitative Serum

Beta-2-Microglobulin (Serum,CLIA)	**2911.00**	ng/mL	670-2143

Interpretation :

1. Beta-2-microglobulin (beta-2-M) is a small membrane protein associated with the heavy chains of class I HLA proteins and hence is present on the surface of all nucleated cells.
2. Serum beta-2-microglobulin levels are elevated in diseases associated with increased cell turnover with Several benign conditions such as chronic systemic inflammation, liver disease, renal dysfunction, some acute viral infections .
3. Malignancies, especially hematologic malignancies associated with the B-lymphocyte lineage & plasma cell disorders.In multiple myeloma, beta-2-microglobulin is considered as a powerful prognostic factor.

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MADAN LAL 54183073604

PID NO: P11180299378

Age: 57 Year(s) Sex: Male

Reference:

Sample Collected At:
METROPOLIS HEALTHCARE LTD DELHI
F-2, Block -B1 (Ground Floor) Mohan Co-oprative Industrial Estate Mathura Road, New Delhi -110044
Zone: OUT-01(OS)110044

VID: 11187315336

Registered On:
16/06/2018 06:13 PM

Collected On:
15/06/2018

Reported On:
18/06/2018 05:45 PM

Investigation	Observed Value	Unit	Biological Reference Interval

-- End of Report --

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