Immunofixation- Qualitative, Serum*

(Serum)

Investigation	**Observed Value**
Electrophoretic Zone	
IgG	**Present**
IgM	Absent
IgA	Absent
Kappa	**Present**
Lambda	Absent
M-Band	**Present**
Impression	IgG Kappa

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).

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KAPTAN SINGH PID NO: P542000026545 Age**:** 45.0 Year(s) Sex: Male	**Reference:** Sample Collected At: DR VINAY KUMAR CHOPRA KOS Diagnostic Lab, 6349/I, Nicholson Road, Ambala Cantt, HRY 133001. **133001**	**VID: 54203150022660** Registered On: 20/07/2020 12:38 PM Collected On: 18/07/2020 12:38PM Reported On: 22/07/2020 05:03 PM

Investigation	Observed Value	Unit	Biological Reference Interval
Immunofixation-quantitative Serum Immunoglobulin Profile (Serum,Nephelometry)			
IgG Total	**4380**	mg/dL	700-1600
IgA Total	**50**	mg/dL	70-400
IgM Total	**26**	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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Beta-2-Microglobulin

(Serum)

Investigation	Observed Value	Unit	Biological Reference Interval
Beta-2-Microglobulin (CLIA)	2099	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.

Abbreviation :
CLIA : Chemiluminescence Immunoassay

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Kappa And Lambda-Freelite Serum*

(Serum)

Investigation	Observed Value	Unit	Biological Reference Interval
Free Kappa (Light Chain), Serum (Nephelometry)	**68.9**	mg/L	3.3-19.4
Free Lambda (Light Chain), Serum (Nephelometry)	6.65	mg/L	5.71-26.3
Free Kappa/ Lambda Ratio*	**10.36**		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

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Investigation	Observed Value	Unit	Biological Reference Interval
Immunofixation-quantitative Serum			
SERUM, PROTEIN ELECTROPHORESIS (Serum)			
Total Protein (Biuret)	**17.2**		6.4-8.3
Serum Albumin	4.45	g/dL	3.57-5.42
Alpha 1 Globulin	**0.41**	g/dL	0.19-0.40
Alpha 2 Globulin	0.72	g/dL	0.45-0.96
Beta 1 Globulin	0.52	g/dL	0.30-0.59
Beta 2 Globulin	**0.17**	g/dL	0.20-0.53
Gamma Globulin	**10.92**	g/dL	0.71-1.54
Albumin, Globulin Ratio	**0.35**		1.1-2.2
"M" Band	**Present**		Absent
Comment	M-Band seen in Gamma region.		

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	Major Components	Interferences
Albumin	Albumin	Lipoproteins, Drugs, Bilirubin, Radiological contrast
Alpha1 - globulins	α-1 antitrypsin, α-1 acid glycoprotein	-
Alpha2 - globulins	α-2 macroglobulin, haptoglobin	Haptoglobin - haemoglobin complex
Beta globulins	Transferrin, β-lipoprotein, IgA, IgM & sometimes IgG with complement proteins – C3 & C4	Fibrinogen
Gamma globulins	IgG, IgA, IgM,IgD, IgE	CRP

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Investigation	Observed Value	Unit	Biological Reference Interval

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

Remarks :
1.In following conditions serum Immunofixation is required to confirm monoclonal gammopathy or to differentiate monoclonal and polyclonal disorders.
(A) A well defined 'M' band
(B) Non-discrete bands..
(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. SPE- Distortions/ Non-Discrete bands:

Distortions in Serum Protein Electrophoresis (SPE) usually affect curves of the gamma, beta, and alpha-2 peaks. Distortions are subtle, non-discrete bands which cannot be quantified & therefore not plotted on the graphs.These could be seen in the following situations:

a) Patients on therapy for Multiple myeloma.
b) Distortions at the point of sample application can be especially problematic when one is dealing with cryoglobulins (often precipitates at the origin).
c) Monoclonal gammopathies involving any of beta-migrating immunoglobulins (produce subtle distortion of the transferrin or C3 band)
d) Subtle distortions in the beta & gamma regions may indicate towards Ig D / Ig E gammaopathies.

Method : Capillary Electrophoresis

-- End of Report --

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