

## REFERENCES

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## Problems get multiplied if they are not detected at the earliest.

Dr Lal PathLabs offers end-to-end solutions by providing a comprehensive range of **Multiple Myeloma** tests.



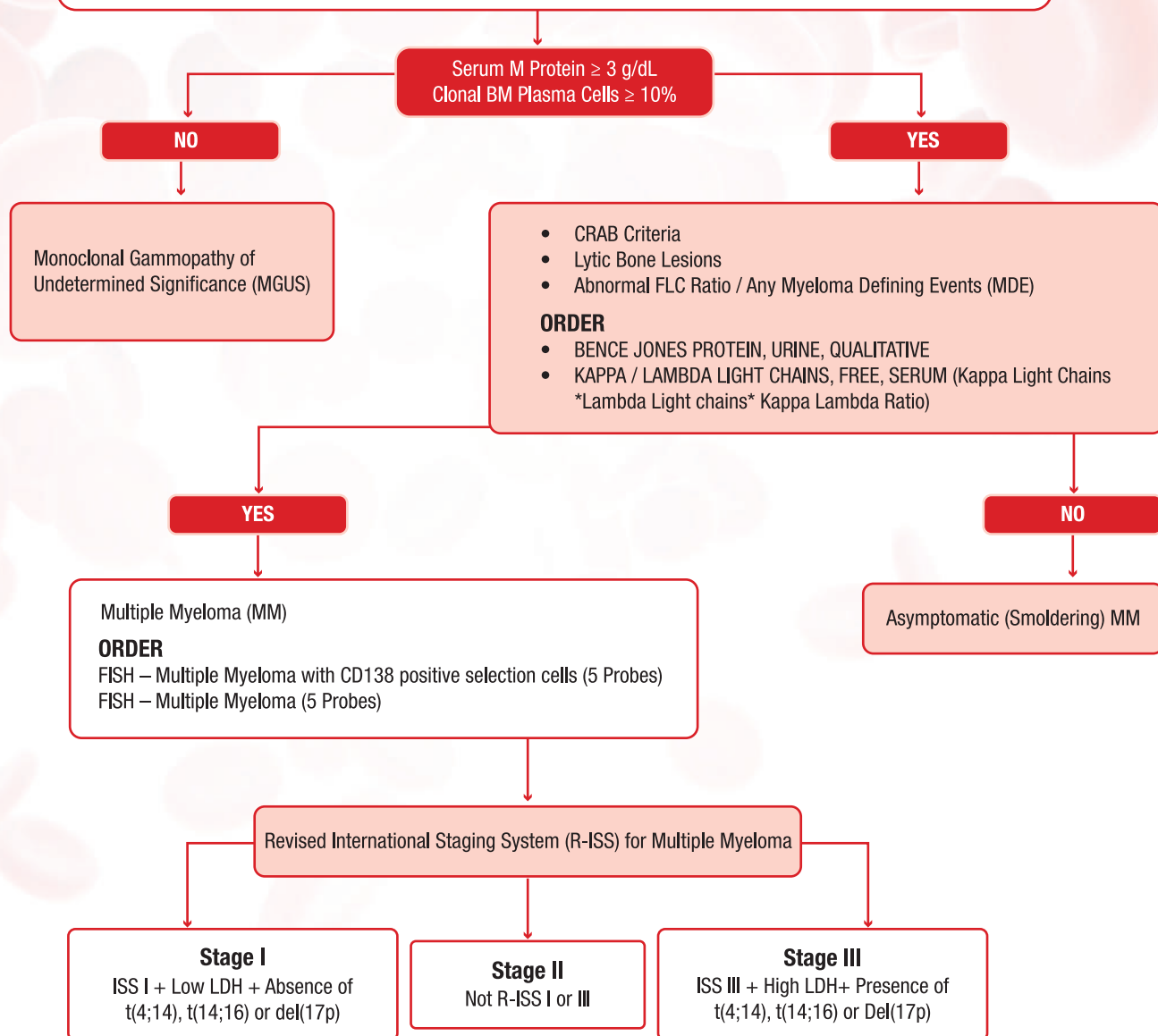
## MULTIPLE MYELOMA

### INITIAL DIAGNOSTIC WORK-UP FOR MULTIPLE MYELOMA

CBC, Differential, Platelet count, Serum BUN/creatinine, Electrolytes, Albumin, Calcium, Serum LDH and Beta-2 microglobulin, Serum Quantitative Immunoglobulin's, Serum Protein Electrophoresis (SPEP), Serum Immunofixation Electrophoresis (SIFE), 24-h urine for total protein, Urine Protein Electrophoresis (UPEP), Urine Immunofixation Electrophoresis (UIFE), Serum Free Light Chain (FLC) assay, M Protein, Quantification of IgG, IgA, IgM

#### ORDER

- IMMUNOGLOBULIN IgA, SERUM
- IMMUNOGLOBULIN IgG, SERUM
- MULTIPLE MYELOMA SCREENING PANEL (\*Protein electrophoresis, serum \*Immunofixation electrophoresis, serum \* Kappa / Lambda Light Chains, Free, serum \*, Immunoglobulin Profile, serum)
- PROTEIN & IMMUNOGLOBULIN PANEL (\*Protein Electrophoresis, Serum \*Immunoglobulin profile serum)
- MULTIPLE MYELOMA MONITORING PANEL (assess changes and proportions of various proteins, particularly the M-protein, in a known case of Monoclonal gammopathy, The level of  $\beta 2$  microglobulin and the FLC ratio)



\*Myeloma Defining Events (MDE) : Calcium >0.25 mmol/L (>1 mg/dL) higher than the upper limit of normal or >2.75 mmol/L (>11 mg/dL)

- Renal insufficiency (creatinine >2 mg/dL) [>177  $\mu\text{mol/L}$ ] or creatinine clearance <40 mL/min
- Anemia (hemoglobin <10 g/dL or hemoglobin >2 g/dL below the lower limit of normal)
- One or more osteolytic bone lesions on skeletal radiography, CT or PET/CT
- Clonal bone marrow plasma cells  $\geq 60\%$
- Abnormal serum FLC ratio  $\geq 100$  (involved kappa) or  $\leq 0.01$  (involved lambda)
- >1 focal lesions on MRI studies  $\geq 5\text{mm}$

## NICE 2016, GUIDELINES ON MULTIPLE MYELOMA

While performing a bone marrow aspirate and trephine biopsy to provide prognostic information:

- Fluorescence In-situ Hybridization (FISH) on CD138-selected bone marrow plasma cells to identify the adverse risk abnormalities t(4;14), t(14;16), 1q gain, del(1p) and del(17p) (TP53 deletion). Use these abnormalities alongside International Staging System (ISS) scores to identify people with high-risk myeloma.
- Consider FISH on CD138-selected bone marrow plasma cells to identify the adverse risk abnormality t(14; 20), the standard risk abnormalities t(11; 14) and hyperdiploidy.
- Consider immunophenotyping of bone marrow to identify plasma cell phenotype and to inform subsequent monitoring.
- Consider immunohistochemistry (including Ki-67 staining and p53 expression) on the trephine biopsy to identify plasma cell phenotype and give an indication of cell proliferation to provide further prognostic information.
- Perform serum-free light-chain assay and use serum-free light-chain ratio to assess prognosis.

## KEY INVESTIGATIONS

| Test Code | Test Name  | Method   | TAT   |
|-----------|--|--|---|
| U103      | BENCE JONES PROTEIN, URINE, QUALITATIVE  | Chemical   | Daily   |
| U051      | BETA - 2 - MICROGLOBULIN, 24 HOUR URINE  | CLIA   | Daily   |
| R061      | BETA - 2 - MICROGLOBULIN, SERUM  | CLIA   | Daily   |
| XX032     | FISH – Multiple Myeloma with CD138 positive selection cells (5 Probes) Del 13q14.3,del17p13.1, t(11;14)CCND1/IGH, t(4;14)FGFR3/IGH and t(14;16)IGH/MAF   | FISH   | Sample Daily by 4 pm; Report in 7 Days.             |
| XX027     | FISH – Multiple Myeloma (5 Probes) Del 13q14.3, del 17p13.1, t(11;14)CCND1/IGH, t(4;14) FGFR3/IGH and t(14;16)IGH/MAF  | FISH   | Sample Daily by 4 pm; Report in 7 Days.             |
| B078      | IMMUNOGLOBULIN IgA, SERUM  | Immunoturbidimetry   | Daily   |
| B077      | MMUNOGLOBULIN IgG, SERUM   | Immunoturbidimetry   | Daily   |
| U079      | KAPPA / LAMBDA LIGHT CHAINS, FREE, URINE   | Nephelometry   | Sample Mon through Sat by 4 pm; Report on same day. |
| B148      | KAPPA / LAMBDA LIGHT CHAINS, FREE, SERUM (Kappa Light Chains *Lambda Light chains* Kappa Lambda Ratio)   | Nephelometry   | Sample Mon through Sat by 4 pm; Report on same day. |
| Z780      | LEUKEMIA DIAGNOSTIC PANEL: PLASMA CELL DYSCRASIAS  | Flow Cytometry   | Sample Daily by 9 am; Report on same day.           |
| Z782      | MULTIPLE MYELOMA SCREENING PANEL (*Protein electrophoresis, serum * Immunofixation electrophoresis, serum * Kappa / Lambda Light Chains, Free, serum * Immunoglobulin Profile, serum)  | Capillary Electrophoresis, Agarose Gel Electrophoresis, Immunoturbidimetry   | Sample Daily by 9 am; Report on next day.           |
| Z016      | PROTEIN & IMMUNOGLOBULIN PANEL (*Protein Electrophoresis, Serum* Immunoglobulin profile serum)   | Immunoturbidimetry, Capillary Electrophoresis  | Sample Daily by 9 am; Report on same day.           |
| E005      | IMMUNOFIXATION ELECTROPHORE SIS (IFE), SERUM (Includes qualitative identification of IgA/IgG/IgM, Heavy Chains and Kappa/ Lambda Light Chains. Does not include identification of IgD/IgE Heavy Chains for IgD/IgE Heavy Chain typing).  | Agarose Gel Electrophoresis and Immunofixation   | Sample Daily by 9 am; Report on next day.           |
| Z842      | MULTIPLE MYELOMA MONITORING PANEL *beta - 2 - Microglobulin, Serum; Complete Blood Count; Cbc; Urea, Serum; Creatinine, Serum; Calcium, Serum; Albumin, Serum; Ldh; Lactate Dehydrogenase; Immunoglobulin Profile, Serum; Protein Electrophoresis, Serum; Immunofixation Electrophoresis (IFE), Serum; Kappa / Lambda Light Chains, Free, Serum. | Capillary Electrophoresis, Agarose Gel Electrophoresis, Immunoturbidimetry, CLIA Spectrophotometry, Electrical Impedance, VCS Nephelometry | Sample Daily by 9 am; Report on next day.           |