

REFLEX TESTING

I. Purpose

To provide guidelines in regards to Reflex testing.

II. Introduction

Automatic reflex testing is performed by Beaumont Laboratory following standards of laboratory practice. Beaumont is committed to abiding by all Federal and State laws, regulations and guidelines regarding reflex testing.

Reflex testing occurs when initial test results are positive or outside normal parameters and indicate that a second related test is medically appropriate.

III. Reflex Tests

Based on the initial screening results, titers are performed if indicated for the following tests:

1. Anti mitochondrial antibodies (AMA)
2. Anti nuclear antibodies (ANA)
3. Anti DNA ds.
4. Anti smooth muscle antibodies (ASMA)
5. Streptozyme
6. Cold agglutinins
7. RPR

ABO Grouping

- If patient appears to be group A or AB with unexpectedly positive reverse typing, then ...
 - ✓ Reflex testing: special antigen typing for A1 antigen, and antibody identification
 - ✓ Process followed for group AB patients also.
- If patient appears to be group B with unexpectedly positive reverse typing, then...
 - ✓ Reflex testing: antibody identification.

AFB Culture:

- Includes molecular probe for MTB complex but not rifampin resistance.

Amniotic fluid AFP:

- This is a send out test and if elevated AFP we reflex to acetylcholinesterase testing.

Anti-Nuclear Antibody (ANA) evaluation:

- Run ANA screen by immunofluorescence
- If greater than cut-off, immunofluorescence microscopy performed - pattern and titer reported.

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Antibody Identification:

- If a new antibody specificity is identified, then...
 - ✓ Reflex testing: Special Antigen Typing of patient's RBCs for each specificity (may result in multiple charges).
- If autologous control is positive during antibody identification, then...
 - ✓ Reflex testing: Direct Antiglobulin Test x1 (DAT X3 polyspecific, monospecific IgG and C3d done if polyspecific is positive).
- If prenatal patient has or has had clinically significant antibody identified, then...
 - ✓ Reflex testing: Antibody Titer q 3-4 weeks. If multiple clinically significant antibodies are present, then a titer is performed for each specificity resulting in multiple charges.
- If antibody activity includes a broadly reactive cold or warm antibody interfering with determination and identification of alloantibodies or crossmatches, then...
 - ✓ Reflex testing may include: Adsorptions, Pretreat RBC w/ Enzymes and/or Pretreat Serum by Dilution and/or Pretreat Serum by different absorption methods, Red Cell Adsorptions and Antibody Identification, antigen typing of the patient. Multiple charges may be generated for each sample depending upon complexity of the serological problem.
- If an Antibody Identification is ordered and the patient has no previous history of antibody, then...
 - ✓ Indirect Coombs (Antibody Screen) is performed first.
- If an Antibody Titer is ordered, and the patient has not had antibody identification performed within the last month, then...
 - ✓ Antibody Identification is performed first.

Complete Blood Count with Differential (CBC with Diff):

- This will include an automated differential. A manual differential will be reflexed and reported if the automated differential meets pathologist-established criteria.
- If results are abnormal and meet criteria for requiring pathologist review, the slides and instrument print out are sent for pathologist review.
- If suspect microorganisms are seen on smear, refer to Microbiology for confirmation.

Crossmatching:

- If patient has clinically significant antibody(ies), then...
 - ✓ Reflex testing: Unit Antigen Screen with antisera. Multiple charges generated (# of units tested x number of antigens tested for)...
- If patient with a previous history of clinically significant antibody has incompatible crossmatches with units known to lack corresponding antigen(s), then...
 - ✓ Reflex testing: Antibody Identification
- If patient has incompatible crossmatches due to broadly reactive warm or cold auto or allo antibody, then...
 - ✓ Reflex testing: Unit Antigen Screen with patient sera, unit antigen screen with reagent anti-sera, phenotypically similar matched units or least incompatible. Multiple charges will be generated equal to number of units tested to locate compatible or least incompatible.

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Direct Antiglobulin Test:

- If Direct Antiglobulin Test is positive for IgG, and patient is baby of mother with clinically significant antibody, then...
 - ✓ Reflex testing: Antibody Identification on eluate from baby's RBCs.
- If Direct Antiglobulin Test is positive on post transfusion specimen, then...
 - ✓ Reflex testing: Antibody Identification on eluate from patient's RBCs.
- If a Direct Antiglobulin Test is ordered on a patient > 4 months of age, then...
 - ✓ DAT is performed using polyspecific AHG. If positive then reflex test: 2 additional DATs IgG and C3 (monospecific).

Fetal Cell Screening:

- If post-partum mother is Rh(D) negative and baby is Rh(D) positive, then...
 - ✓ Reflex testing: RhIG Testing
- If the fetal cell screen is positive, mother or baby is weak D positive, OR baby's Rh type cannot be determined (e.g. no specimen, invalid Rh testing results), then...
 - ✓ Reflex testing: Quantitative Fetal Screen ordered by Blood Bank.

Fluid cell count and differential:

- Body fluid differentials will be performed when the WBC count is greater than or equal to 10.
- Spinal Fluid (CSF) differentials will be performed when the WBC count is greater than or equal to 5.
- If results are abnormal and meet criteria for requiring pathologist review, the slides and lab print out are saved for pathologist review.
- If suspect microorganisms are seen on the smear, refer to Microbiology for confirmation.

Cryptococcus Antigen:

- If antigen is positive a titer will be performed.

Group A Strep Screen:

- If positive, no additional testing is performed unless specifically requested

Group B Strep Screen (Streptococcus agalactiae):

- A vaginal/rectal screen reflex to include susceptibility testing.

HBsAg:

- All positives confirmed

Hepatitis A Antibody

- If the hepatitis A antibody is positive, a hepatitis A IgM is performed.

HCV antibody testing for inpatient "source":

- All positives are sent to Warde for HCV RNA Quantitation by PCR

HIV-AB

- If positive, HIV-4th Generation Diagnostic Discriminatory Assay is performed.

Rapid Group A Antigen:

- If negative a Throat Strep Screen will be performed.

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Rapid Group B Amplified Probe:

- If negative by PCR, a GBS culture will be performed.

Serum monoclonal gammopathy evaluation:

- Run SPE and complete immunofixation
- If new abnormality or monoclonal obscured by other proteins, one or more immunoglobulin quantitations performed.
- Immunoglobulin quantitations also performed at discretion of pathologist (e.g. hypogammaglobulinemia).

Microbiology Cultures

- Microbiology cultures include complete identification and susceptibility testing if appropriate based on source and other organisms present.

RPR:

- All positive In-Patient's tested by the fluorescent treponemal antibody absorption (FTA-ABS) test. Out-Patient physicians are contacted to find out if they want testing done.

Serum protein electrophoresis

- If a significant abnormality is detected on serum protein electrophoresis and the pathologist or clinical chemist determines that an immunofixation is appropriate, an immunofixation is performed.

Stool Culture

- Includes testing for enterohemorrhagic *E. coli*

Trichomonas Culture

- Includes direct examination when appropriate

Urinalysis Cath Reflex Testing

- Cath Urinalysis Reflex testing is for Inpatients only and must be within 96 hours of receiving a Catheter. Criteria for Microscopic = Any chemical component is positive. Criteria for Culture: WBC >10/HPF and Squamous Epi <50/LPF

Urinalysis Reflex

- Testing will consist of the chemical analysis and a microscopic exam if any chemical component is positive.

Virus Culture

- Specific testing determined by site.

ANATOMIC PATHOLOGY

In the anatomic pathology laboratory, pathologists use their judgment to order and examine additional studies on submitted specimens if they deem them medically necessary in order to render a diagnosis. In these situations, pathologists are acting in the capacity of a consultant in the care of the patient. This includes but is not limited to ordering special stains, decalcification of tissue, immunoperoxidase stains, microbiology cultures on tissue specimens, electron microscopy, and flow cytometry on certain tumors if indicated.

The anatomic pathology reflex test list below includes tests that Beaumont Laboratory performs if a specimen meets the reflex criteria listed. The anatomic pathology reflex test list includes tests that are often useful for the diagnosis and prognosis of the patient. Treating providers may decline the reflex testing by indicating that on the laboratory requisition or by contacting Beaumont Laboratory's Customer Service Department.

Fluorescence *in situ* hybridization (FISH) Panels

- A FISH Panel for chronic lymphocytic leukemia/lymphoma (CLL), plasma cell myeloma, or myelodysplastic syndrome (MDS) will be performed on all newly diagnosed patients. All subsequent follow up studies will be reflexed to FISH when an abnormal clone was found by previous studies and is not evident by conventional analysis.

Mismatch Repair Analysis (IHC)

- Performed on all newly resected colorectal carcinomas as an initial screen for high risk colorectal cancer syndromes. If Mismatch Repair Protein Immunohistochemistry Testing (MMR) for colorectal cancers are abnormal (loss of nuclear expression) for MLH1 and PMS2, the laboratory will proceed with reflex testing for MLH1 promoter methylation and BRAF testing.

Aggressive B-Cell Lymphoma Panel

- When a biopsy is evaluated for aggressive B-cell lymphoma, the LSI MYC and BCL6 Dual Color Break Apart Rearrangement probes as well as the LSI IGH/BCL2 Dual Color Dual Fusion Translocation probes will be run initially when indicated by Pathologist.
- If a MYC gene rearrangement is present we run the LSI IGH/MYC. If the LSI IGH/MYC is negative we can reflex to the IGH/MYC [for evaluation of the t(2;8)(q12;q24) and IGL/MYC [for evaluation of the 8;22)(q24;q11)] probes to determine the MYC gene translocation partner.

p16

- Immunohistochemistry (IHC) testing performed on all newly diagnosed head and neck squamous carcinomas arising in the oropharynx (Base of tongue and tonsils)
- IHC testing performed on squamous carcinoma presenting as a lymph node metastasis of unknown primary site

Plasma Cell Myeloma Reflex Testing

- When the IgH and CCND1 Dual Color Dual Fusion Translocation probe to evaluate for the presence of the t(11;14)(q13;q32) shows additional copies of 14 the FGFR3/IGH, IGH/MAF and IGH/MAF-beta Dual Color Dual Fusion probes will be reflexed to evaluate for the presence for the t(4;14)(p16;q32), the (14;16)(q32;q23), and t(14;20)(q32;q12) respectively.

Reflex Testing

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