

February 2018

Maximum Surgical Blood ordering Schedule

Maximum Surgical Blood ordering Schedule (MSBOS) a list of commonly performed surgical procedures along with the most appropriate pre-transfusion testing and number of units to be crossmatched based on predicted surgical blood needs prior to surgery. MSBOS acts as a guide for preoperative blood ordering. For minor surgical procedures, only "Type and Screen" (T/S) is usually needed and for major surgical procedures, where significant blood loss is anticipated, "Type and Crossmatch" (T/C) with number of units is ordered. Several variables must be considered when making this decision, including the anticipated blood loss for a given procedure, the preoperative hemoglobin concentration, and the relative risk of transfusing emergency-release type-O blood during unexpected hemorrhage when preoperative T/S or T/C are unavailable.

MSBOS are used to:

- Promote efficient use of blood inventory. A crossmatched unit becomes unavailable for other patient's.
- Avoid outdated and wastage of blood units.
- Reduce pre-transfusion testing and minimize unnecessary crossmatching. Blood bank operates with limited resources which should be utilized appropriately.
- Enhance quality of care and patient safety.

The crossmatch-to-transfusion (C:T) ratio is the number of RBC units crossmatched divided by the number of RBC units actually transfused and is most useful in determining individual physician or specialty-specific ordering practices. A C:T ratio of >2 is usually indicative of excessive ordering of crossmatched blood and may identify instances when a preoperative T/S order is more appropriate.

The MSBOS list is not exhaustive, nor does it supersede clinical judgement. If a patient has

known antibodies, is anaemic or complications are envisaged, extra units of blood may be required. Transfusion Medicine Physicians work with ordering physician to help with ordering appropriate blood products in such scenarios.

SLHS is updating its MSBOS using blood utilization data extracted from blood bank, anesthesia, and surgery information management system along with published evidence-based guidelines. Updated MSBOS will help optimize the process of preoperative blood ordering and can potentially improve blood bank and operating room efficiency, increase patient safety, and decrease costs.

Coagulation Screen and Fibrinogen

Saint Luke's Health System is removing fibrinogen from the current 3-part "Coagulation Screen" and replacing it with the new "Clotting Screen" which includes PT and PTT only. Fibrinogen is available as a separate test. Every applicable order panel, order set, and provider preference list in the inpatient, ED, and ambulatory setting has been updated with the new 2-part Clotting Screen on Wednesday, February 21, 2018. The old "Coagulation Screen" will not be accessible after Go Live.

Allergy tests for Ampicillin & Amoxicillin not available

Ampicilloyl and Amoxicilloyl, IgE sensitization detection tests for Ampicillin and Amoxicillin allergy, respectively, will not be available until further notice. Thermo Fisher Scientific, the only supplier of reagents for these tests, has recalled all testing reagents because of reduced stability of the reagents that may result in erroneous test results. The response level for some samples is decreased, thereby causing false negative test results; results below the assay Limit of Quantification may occur for low positive samples.

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Currently, there is no option for an alternative test in US. Healthcare providers at Saint Luke's Health System utilizing these tests can contact Pathology physicians with any questions.

Enterobacter aerogenes* Renamed *Klebsiella aerogenes

The genomic era has resulted in reclassification of many bacterial species, both pathogenic and non-pathogenic. Notably, *Enterobacter aerogenes* is now reported as *Klebsiella aerogenes* by Saint Luke's Microbiology due to a nomenclature change.

Klebsiella species and *Enterobacter* species are members of the Enterobacteriaceae family of enteric gram-negative rods. These bacteria are widely dispersed in the environment and are commonly found in soil and water, as well as the human gastrointestinal tract. Immunocompromised patients are most susceptible to infections from these organisms, which are most commonly isolated from urinary tract and occasionally from the bloodstream. Both *Klebsiella* and *Enterobacter* are intrinsically resistant to ampicillin, and both have reported strains that are resistant to carbapenems.

Utility of Peripheral Blood Flow Test in Diagnosis of Lymphoproliferative Disorder

Flow cytometric analysis is part of initial diagnostic work-up of chronic lymphoproliferative disorder (LPD). Flow cytometry uses a robust technology capable of accurate sub-classification in most cases of suspected LPD within a reasonable turn-around-time. For example, identification of CD5 positive clonal B cells in chronic lymphocytic lymphoma and CD10 positive clonal B cells in follicular lymphoma. In cases with no expression of CD5 and CD10, identification of a clonal B cell population by flow cytometric analysis is helpful in confirmation of the malignancy.

Absolute lymphocytosis or cytopenias detected on routine CBC, lymphadenopathy, splenomegaly, and other such suspicious findings usually alert the clinician of a possible LPD. In most patients, peripheral blood flow testing is initiated. Because of the diversity in the immunophenotypic characteristics of various B-cell and T-cell lymphomas, a broad flow cytometry antibody panel is needed, if the entire range of diagnostic possibilities is to be covered. These extensive

panels can be unnecessary and cost prohibitive especially in cases with low pre-test probability of the disease.

Prior studies have shown that factors such as absolute lymphocyte count (ALC) and patient's age can predict the likelihood of LPD, suggesting that these parameters can be used to triage flow studies. University of Wisconsin undertook a study to evaluate peripheral blood flow studies performed on suspected LPD to develop a value-based analysis algorithms based on optimal cut off values for ALC and patient age. The study identified 249 cases over a period of two years, of which approximately 54% of cases were newly diagnosed LPD, while 43% were benign, based on the flow study results. Small number of cases (2%) negative for LPD, after morphological review were found to have another hematological malignancy (myelodysplastic syndrome, leukemia, and myeloproliferative neoplasm).

The most common B cell lymphoma diagnosed was chronic lymphocytic leukemia, and the most common T cell neoplasm was T cell large granular lymphocytic leukemia. The study evaluated ALC in cases with positive flow test and found 4,830 cells/uL as an optimum cutoff value with sensitivity of 78.26% and specificity of 86.36%. Another variable identified to predict the overall likelihood of LPD was presence of sustained ALC of > 3,500 cells/uL for at least 3 months. Patient age, was also identified as another predicting factor for likelihood of LPD, increasing age showed a significant association with the disease. At optimum cutoff value of 63 years for age, the sensitivity was 68.7% and specificity 71.6%.

At Saint Luke's Hospital, we performed flow testing on approximately 207 peripheral blood from June 2017-November 2017. Of these, leukemia and lymphoma flow testing was requested in 188 peripheral blood specimen. In approximately 70% of the specimen, we did not identify LPD or any other hematological malignancy. The remaining 30% of the specimen showed positive flow findings, of which approximately 46.4% had a prior history of LPD or other hematological malignancy and approximately 53.6% were new diagnosis.

In conclusion, ALC count (> 5,000 cells/L) and age (>55 years), could be used to stratify patients into high or low risk of having an LPD, before requesting peripheral blood flow testing.