Maximum Surgical Blood Order Schedule (MSBOS) Development Tool

1. **Purpose:** The maximum surgical blood order schedule (MSBOS) is a tool for transfusion services, surgical services, and anesthesia to predict blood utilization based on historical experience within an institution. The MSBOS is meant as a guide and should not interfere with the use of clinical judgement related to individual patients needs. A well designed MSBOS process provides flexibility to the user. The ultimate goal of using an MSBOS is to raise efficiency without compromising patient safety.[1] Hospital laboratories that have implemented 'just in time' crossmatching such as electronic or immediate spin methods rely less on an MSBOS. However, it can still be a useful guide in the case of a patient with an identified clinically significant antibody where antigen compatible units need to be available for the procedure. An MSBOS can also be useful in determining which procedures may require deferral in the event of a blood supply shortage.

2. **Scope:** The MSBOS can be applied to elective surgical procedures that carry a risk of transfusion. In the mid-70's it was found that a type and screen provides adequate cover for procedures that used an average of <0.5 units of red blood cells per patient. Development of the MSBOS can also provide guidance on which surgical procedures do not require preoperative transfusion testing (if there is a low likelihood of transfusion) and the number of units that may need to be crossmatched in the event that preoperative testing reveals the presence of a clinically significant red cell antibody.[2] For those procedures likely to require blood, the recommended blood order for a procedure should provide for the transfusion needs of 90% of patients.[3]

3. **Methods:** Ideally, the data used to create the MSBOS is taken from the historical experience within an institution. Using institutional specific data will help reduce some of the barriers to implementation as a result of challenges to the validity of the suggested ordering schedule. To create an MSBOS, the following information is required:[2]
   - percent of patients transfused per procedure
   - median estimated blood loss per procedure
   - average # units transfused per patient by procedure

   A comparison between the number of units ordered and the number of units transfused by procedure may be performed either prospectively or retrospectively. The length of time for data collection will be dependent on the number of procedures performed. The data collection may either be defined over a specific timeframe or for a pre-determined number of procedures performed.

   Retrospective study – a review of one to two years of historical data, depending on the number of surgical procedures performed.

   Prospective study – gather information related to surgical procedures comparing blood ordered versus blood used on a 'real time' basis.

Benchmarking – with facilities performing comparable procedures for new facilities or new procedures where historical institutional specific data is not available, data from another facility may be used in consultation with the facility's surgeons and anesthetists with agreement to review site specific data and revise as necessary within a pre-determined time.

4. **Discussion:** Over-ordering of blood for surgical procedures removes blood from inventory and increases the chance of wastage.[4] An MSBOS is meant as a guide and does not replace the need for individual patient assessment. The successful implementation of an MSBOS is directly related to the degree of cooperation and commitment by the surgeons, anesthetists and the transfusion medicine (TM) service medical director. In addition, the technologists in the TM laboratory need to be empowered to provide only that which was set out in the MSBOS unless exceptional circumstances exist. Ideally exceptions would require a consult with the TM medical director.

5. **Monitoring:** Audits of ordering practice should be performed on a predetermined basis or when there is a change in surgical technique. Monitoring physician ordering practice related to blood components and products is a recommended activity to be undertaken by the hospital transfusion committee.[5] The MSBOS can then be revised to reflect changes in practice. If there is no 'gate-keeping' performed prospectively, review of ordering practice will also facilitate discussion related to compliance.

6. **Approval:** Approval of an MSBOS should be through the Transfusion Committee (or equivalent) and Medical Advisory Committee.

7. **Conclusion:** Use of the MSBOS results in a reduction in workload related to performing unnecessary type and screens and crossmatching. Standardizing ordering practice is applicable in all institutions and it may be particularly beneficial for use in teaching facilities where preoperative ordering is often done by interns and residents unfamiliar with blood utilization related to specific procedures and who have no previous experience within the institution. Using an MSBOS in conjunction with electronic crossmatching may result in a further reduction in workload.

References:

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