

Could MSBOS contribute to patient blood management in the era of global financial crisis?

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Maximum surgical blood order schedule (MSBOS) is a program to optimize blood ordering in elective surgical cases and shows a high interest in the recent years in the setting of patient's blood management. Actually the first attempt as well as the terminology must be attributed to Friedman in the early 70s, who proposed this program in order to reduce the number of red blood cell (RBC) units cross-matched preoperatively for patients undergoing elective surgical procedures. The initial purpose of Friedman's idea was to prolong the availability of RBC units by minimizing the time they spend in an assigned or cross-matched status [1]. The main criteria used forty years ago to establish an MSBOS were the mean number of blood units used per patient undergoing the same operation in the same center.

Since then several attempts have been made and a lot of effort has been succeeded. The use of electronic data bases in blood banks as well as in surgical clinics and anesthesiology departments provides in short time a lot of information regarding the number of blood units used for every single surgical procedure. An example for a new proposal was that by Frank et al. for John Hopkins university Hospital. In this example, the criteria used for each procedure category included the number of patients transfused with RBC units, the number of RBC units transfused and the transfusion index (total number of RBC units transfused divided by

the total number of patients undergoing the same type of operation). At this point it should be pointed out that despite the attempt to optimize an MSBOS program by using objective criteria the subjective feeling of the surgeon regarding the possibility of intra-operative bleeding is included to evaluate the risk of bleeding [2]. This fact makes the personal communication between surgeons, anesthesiologists and blood bank medicals very important and necessary. Several other groups have also tried to create such programs for their hospitals using, however, fewer criterions [3, 4]. Even in the John Hopkins Hospital paradigm several factors can be further considered in the final risk assessment of perioperative transfusion such as the preoperative hemoglobin.

The success of such a program can be estimated by some indexes that reflect the ratio of the units of blood that have been typed and screened or typed and cross-matched to units of blood that have been at the end transfused (T&S/T and T&C/T). An ideal type and cross matched to transfusion ratio has been described as two to one (2:1). This index is actually translated as for every blood unit we use we crossmatch two units. A further index of a successful MSBOS regards the cost and calculates the actual cost of a procedure to the charges of the hospital. It is easy to understand that an elevated type and cross-match to transfusion index elevates also the charges of a procedure in comparison to its actual costs.

After implementing the new MSBOS the John Hopkins Hospital group evaluated this in the setting of minimizing unnecessary blood transfusions and reducing costs with some very interesting results. The patients in the category "no sample needed" decreased by 38.1% ($p < 0.001$) while the average monthly percent of patients with any pre-operative blood orders decreased by 17.8% ($p < 0.001$). On the other hand, regarding the transfusion of uncross-matched emergency released (type O) blood in the pre-MSBOS era the rate of emergency released RBCs transfusions was 2.2 patients per 1000 while in the post MSBOS era this ratio raised to 3.1 patients per 1000. This is a very low incidence but with statistically significant increase. Additionally, according to the same data the overall costs decreased significantly both for surgical and

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for all hospitalized patients after implementing MSBOS [5].

There is a question raised why do surgeons order much more red blood cell units than they actually need. Several facts seem to lead towards this direction. First of all the blood ordering for elective cases is made by different medicals every time (nurse, trainee, surgeon, anesthesiologist). The nurse does not always know the true needs in blood for every operation, the trainee is often afraid of being punished for not ordering enough units while the anesthesiologist often overestimates an operation. The surgeon on the other hand either believes in the dogma “better safe than sorry” or does not trust his blood bank that they will be able to deal with a severe and life threatening intra-operative bleeding.

This is the point where surgeons, anesthesiologists and blood bank hematologists must communicate. The routine preoperative cross-matching of one or even two units does not afford the extra margin of safety a surgeon needs in a case of a massive and unexpected intra-operative bleeding.

As a conclusion it seems that there is an emerging need to create an “in house” MSBOS in every hospital as both the variety of surgical procedures, their frequency and the ability of the blood bank to release uncross-matched units differs from hospital to hospital. The implementation of such programs seems to be feasible, increase safety and reflect a modern need in the era of patient blood management and global financial crisis.

Keywords: Blood management, Maximum surgical blood order schedule (MSBOS), Transfusion

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The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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