

When Should a Type and Screen not be Ordered Preoperatively?

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As cost control becomes an increasingly large determinant of medical practice, preoperative testing may become an avenue for perioperative cost management. Studies suggest that without guidance, surgical teams routinely order excessive or incorrect tests for their patients preoperatively. In a 1997 study, a panel of anesthesiologists reviewed preoperative test orders for 5,100 patients and determined that 72.5% of tests ordered by surgeons were not indicated. This finding held most strongly in patients with ASA status I or II- as the severity of the patient's physical status increased, congruence between surgeon-implemented and anesthesiologist-recommended tests increased considerably [1]. Similarly, in a comparative study of routine preoperative testing as ordered by the surgical team versus orders by anesthesiologists and anesthesia residents, Finegan et al. found that when staff anesthesiologists ordered preoperative tests, the number of tests performed (and cost accrued) was reduced and the specificity of tests ordered increased without an attributable difference in patient outcomes [2]. Unfortunately, anesthesiologists often do not have the opportunity to dictate preoperative testing to the extent that might generate healthcare savings; however, the surgical literature itself questions the utility of testing all patients irrespective of comorbidities and surgery type [3-7].

The type and screen is one of a handful of 'routine' preoperative labs ordered by the surgical team. The cost of a type and screen is \$75-100, with an additional \$75-100 for subsequent crossmatching performed. (<http://courses.path.utah.edu/classes/webpath/labs/txlab/txlab.htm>). In a retrospective review of 1063 hysterectomies, Ransom et al. concluded that "in the absence of indications, routine preoperative type-and-screen testing of blood before vaginal hysterectomy is not cost-effective, does not enhance patient care, and should be eliminated" [3]. Indications included preoperative anemia and significant intraoperative blood loss; in total, 26 patients were transfused over the course of the decade-long period studied, and none of them were transfused emergently (i.e., time was available to procure a specimen for type and screen intra- or post-operatively if necessary) [3]. In a second study of type and screen utilization in routine laparoscopy for gynecologic surgery, Ransom et al. again determined that of the 57 women transfused of 7529 studied, all had preexisting conditions (anemia or a known ectopic pregnancy) suggestive of an increased likelihood that transfusion might be required [4]. Similarly, in a review of 2,589 laparoscopic and 603 open cholecystectomies, Usal et al. found a transfusion incidence of 0.46% for laparoscopic and 5.47% for open procedures. Of the 33 patients requiring transfusion, only two were transfused after vascular injury caused significant intraoperative blood loss; the remainder was transfused intraoperatively as a result of preexisting causes of anemia. They estimated an institutional savings of nearly \$80,000 over six years with restriction of preoperative type and screens to those patients with preexisting anemia for cholecystectomy [5]. Similar studies of patients undergoing breast cancer surgeries suggest that the costs saved by avoiding type and screens in this population outweigh the risk of significant blood loss requiring transfusion [6].

In 2001, Van Klei et al. attempted to generate a predictive model for intraoperative transfusion that could then be used to guide preoperative ordering of type and screens. They assessed patient characteristics for 1425 cases deemed at intermediate risk for transfusion (primarily

abdominal and orthopedic procedures) to develop a predictive model for transfusion. Based on their research, female gender, age >70 yrs and surgery type were independent predictors of transfusion; by scoring patients based on each of these factors and ordering type and screens for patients scoring equal to/ greater than two points, 35% of preoperative type and screens could be avoided, at significant savings to the healthcare system. Subsequent elimination of patients when preoperative hemoglobin >14mg/dL reduced testing by an additional 24%, albeit at a cost of five missed transfusions. They validated this model in a separate population and found no changes to its sensitivity and specificity [7]. Another study, published this year, suggests that type and screens are unnecessary in patients undergoing surgeries known to result in minimal estimated blood loss (less than 50 ml) [8]. Whether or not these models, or some iteration of it, could be widely implemented, remains to be seen; whether it would change physician behavior is another question. Evidence would suggest, however, that the type and screen is significantly over-ordered, and more attention to gender, age and preoperative hemoglobin within the context of the anticipated surgery could significantly reduce the ordering of unnecessary tests.

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