

## Transfusion therapy in the peri-operative period

Giuseppe Aprili, Claudio Velati, Giancarlo Maria Liumbruno

*Italian Society of Transfusion Medicine and Immunohaematology, SIMTI*

The recommendations concerning transfusion therapy in the peri-operative period, published in *Blood Transfusion* starting in this issue, are evidence of an important, further development of Italian Transfusion Medicine.

Behind this work there is an editorial project that the Italian Society of Transfusion Medicine and Immunohaematology (SIMTI) has pursued with determination and resolution: in the past with the publication of the "*SIMTI Recommendations on the correct use of blood components and plasma derivatives*" to promote therapeutically appropriate transfusion policies within the context of scientifically correct and ethically irreprehensible clinical choices<sup>1-4</sup>, and now with the presentation of a precise and meticulous professional guide to transfusion practices in a particularly delicate moment of the clinical course of surgical patients.

The debate on the utility of guidelines is very topical, as exemplified by two recent articles published in the *British Medical Journal*<sup>5,6</sup>. The "*SIMTI recommendations on peri-operative transfusion*"<sup>7</sup>, which take up and examine in more detail many of the passages of the preceding "*Recommendations*"<sup>1-4</sup>, are not intended to be a final treatise, but rather an indispensable scaffold for building a project that can involve the Institutions and all medical and surgical disciplines that make use of transfusion therapy, particularly Anaesthesiology and General Surgery, two disciplines with which SIMTI has already established a fruitful and open exchange of ideas. The recommendations dealing with two broad aspects of the peri-operative management of surgical patients –the evaluation and management of patients in the pre-operative period and pre-operative strategies to limit the use of allogeneic transfusion –are published in this issue<sup>8</sup>, while those on intra-operative transfusion and the management of surgical patients in the post-operative period will be published in subsequent issues of *Blood Transfusion*.

The development and use of strategies to prevent and reduce bleeding, as well as the promotion of alternatives to allogeneic transfusion, are among the principles that the

European Recommendation Rec (2002) 11 indicates should be applied to improve quality and raise the care intensity of health services in transfusion medicine<sup>9</sup>.

These indications were subsequently included in Italian Law n. 219 of 21 October 2005 (New discipline for blood transfusion activities and national production of blood derivatives)<sup>10</sup>, which includes autologous transfusion and the co-ordination and organisation of peri-operative blood recovery activities among the therapeutic services of transfusion medicine.

In the last 20 years we have seen the birth, development and gradual decline of the practice of pre-operative autologous blood donation. The re-appraisal of the role of predeposit programmes, in large part due to the notable increase in the safety of homologous transfusion therapy, has also been ; i ratified by recent guidelines<sup>11</sup>, which no longer recommend such programmes except in "exceptional clinical circumstances" and suggest, when appropriate, the use of techniques to recover blood in the peri-operative period.

The Ministry of Occupation, Health and Social Policies, in its "*Manual on safety in the operating theatre: recommendations and checklists*"<sup>12</sup>, published in November 2009, indicates systems of peri-operative blood recovery as some of the instruments appropriate to have available for operations in which the loss of large volumes of blood can be foreseen.

Given the growing number of elderly patients, often with multiple disorders, undergoing complex surgical procedures, peri-operative medicine is gaining an ever increasing importance, such that it is almost a specialist discipline<sup>13</sup>. A careful, timely pre-operative evaluation and precise peri-operative medical care can reduce the number of operations that are postponed and prevent most complications and their sequelae<sup>14-16</sup>.

In these recommendations the peri-operative period is intended to be the interval from 30 days before the intervention to 30 days after it. The prevalence of anaemia in the peri-operative period varies in relation to three

factors<sup>17</sup>: (i) the definition of anaemia adopted; (ii) differences in the surgical procedures and the extent of bleeding associated with them; (iii) differences in the types of patients and their co-morbidities.

Anaemia is a common condition in the peri-operative period and is associated with increased transfusion requirements and, consequently, increased morbidity and mortality in surgical patients<sup>18</sup>. Some studies have indicated that higher levels of haemoglobin are correlated with earlier functional recovery in the post-operative period<sup>19,20</sup>. Peri-operative anaemia and the consequent increased transfusion requirements are independent risk factors for post-operative infections, longer time spent in hospital and death in patients undergoing heart surgery or other forms of surgery<sup>21-26</sup>. In countries with a high socio-economic level it is estimated that over 40% of the transfusions of red blood cells are given to surgical patients<sup>27</sup>.

The use of transfusion therapy in the peri-operative period varies widely according to the clinical condition of the patient, the different surgical and anaesthetic techniques used, the urgency of the intervention, the different protocols on blood use and, last but not least, the availability of blood components and alternatives to transfusion<sup>28</sup>.

In conclusion, in the view of growing multidisciplinary integration in modern transfusion medicine, with the aim of adaptation to different health care contexts and of being applicable in their specific care intricacy, the recommendations on transfusion therapy in the peri-operative period are intended to provide the reader with practical indications, based on available scientific evidence and the consensus of experts, on the use of strategies for a correct approach to the surgical patient and optimal peri-operative management of the therapeutic transfusion resources; they also include the use of plasma derivatives, drugs and techniques aimed at limiting the peri-operative need of homologous blood components; finally, they provide an update on the risks and benefits associated with transfusion and adjuvant therapies, such as drugs and techniques used to reduce or prevent haemorrhage and limit transfusion requirements<sup>29</sup>.

All this is the premise to providing a global management of the surgical patient in order to deliver high quality transfusion medicine services as uniformly as possible throughout the country.

## References

- 1) Liumbruno G, Bennardello F, Lattanzio A, et al.

- Recommendations for the transfusion of red blood cells. *Blood Transfus* 2009; **7**: 49-64.
- 2) Liumbruno G, Bennardello F, Lattanzio A, et al. Recommendations for the transfusion of plasma and platelets. *Blood Transfus* 2009; **7**: 132-50.
- 3) Liumbruno G, Bennardello F, Lattanzio A, et al. Recommendations for the use of albumin and immunoglobulins. *Blood Transfus* 2009; **7**: 216-34.
- 4) Liumbruno G, Bennardello F, Lattanzio A, et al. Recommendations for the use of antithrombin concentrates and prothrombin complex concentrates. *Blood Transfus* 2009; **7**: 325-34.
- 5) Grol R. Has guideline development gone astray? Yes. *BMJ* 2010; **340**: c306.
- 6) Gibbons RJ, Antman EM, Smith SC. Has guideline development gone astray? No. *BMJ* 2010; **340**: c343.
- 7) Liumbruno GM, Bennardello F, Lattanzio A, et al. *Raccomandazioni SIMTI sulla trasfusione perioperatoria*. 1<sup>st</sup> ed, June 2010, Edizioni SIMTI, Milan, Italy.
- 8) Liumbruno G, Bennardello F, Lattanzio A, et al; Italian Society of Transfusion Medicine and Immunohaematology (SIMTI) Working Group. Recommendations for the transfusion management of patients in the peri-operative period. I. The pre-operative period. *Blood Transfus* 2011; **9**: 19-40.
- 9) Recommendation Rec (2002) 11 of the Committee of Ministers to member states *on the hospital's and clinician's role in the optimal use of blood and blood products*. (Adopted by the Committee of Ministers on 10 October 2002 at the 81<sup>th</sup> meeting of the Ministers' Deputies). Available at: <https://wcd.coe.int/ViewDoc.jsp?id=312229&BackColorInternet=B9BDEE&BackColorIntranet=FFCD4F&BackColorLogged=FFC679>. Last accessed: 03/25/2010.
- 10) Law n. 219 of 21 October 2005 n. 219. *Nuova disciplina delle attività trasfusionali e della produzione nazionale degli emoderivati*. Gazzetta Ufficiale della Repubblica Italiana n. 251, 27 October 2005.
- 11) British Committee for Standards in Haematology, Transfusion Task Force, Boulton FE, James V. Guidelines on alternatives to allogeneic blood transfusion. 1. Predeposit autologous blood donation and transfusion. *Transfus Med* 2007; **17**: 354-65.
- 12) Ministero del Lavoro, della Salute e delle Politiche Sociali - Dipartimento della Qualità. Direzione Generale della Programmazione Sanitaria, dei Livelli di Assistenza e dei Principi Etici di Sistema - Ufficio III. Manuale per la Sicurezza in Sala Operatoria: Raccomandazioni e Checklist. Ottobre 2009. Available at: [http://www.salute.gov.it/imgs/C\\_17\\_pubblicazioni\\_1119\\_allegato.pdf](http://www.salute.gov.it/imgs/C_17_pubblicazioni_1119_allegato.pdf). Last accessed: 03/25/2010.
- 13) Scott IA, Lodge RS, Russell DM. Evidence-based guide to perioperative medicine. *Intern Med J* 2007; **37**: 389-401.
- 14) Khuri SF, Henderson WG, DePalma RG, et al; Participants in the VA National Surgical Quality Improvement Program. Determinants of long-term survival after major surgery and the adverse effect of postoperative complications. *Ann Surg* 2005; **242**: 326-43.
- 15) Pasternak LR. Preoperative assessment: guidelines and challenges. *Acta Anaesthesiol Scand* 1997; **111**: 318-20.

- 16) Cohn SM, Smetana GW, Weed H. *Perioperative Medicine-Just the Facts*. New York: McGraw-Hill Medical; 2006.
- 17) Napolitano LM. Perioperative anemia. *Surg Clin NAm* 2005; **85**: 1215-27.
- 18) Kuriyan M, Carson JL. Anemia and clinical outcomes. *Anesthesiol Clin North America* 2005; **23**: 315-25.
- 19) Lawrence VA, Silverstein JH, Cornell JE, et al. Higher Hb level is associated with better early functional recovery after hip fracture repair. *Transfusion* 2003; **43**: 1717-22.
- 20) Carson JL, Terrin ML, Jay M. Anemia and postoperative rehabilitation. *Can J Anaesth* 2003; **50** (6 Suppl): S60-4.
- 21) Dunne J, Malone D, Tracy JK, et al. Perioperative anemia: an independent risk factor for infection, mortality and resource utilization in surgery. *J Surg Res* 2002; **102**: 237-44.
- 22) Shen JG, Cheong JH, Huyng WJ, et al. Pretreatment anemia is associated with poorer survival in patients with stage I and II gastric cancer. *J Surg Oncol* 2005; **91**: 126-30.
- 23) Saleh E, McClelland DB, Hay A, et al. Prevalence of anaemia before major joint arthroplasty and the potential impact of preoperative investigation and correction on perioperative blood transfusions. *Br J Anaesth* 2007; **99**: 801-8.
- 24) Harkness M, Palmer JB, Watson D, Walsh TS. A questionnaire-based survey of perioperative blood conservation practice for revision hip arthroplasty in Scotland. *Transfus Med* 2008; **18**: 296-301.
- 25) Karkouti K, Wijeyesundera DN, Beattie WS; Reducing Bleeding in Cardiac Surgery (RBC) Investigators. Risk associated with preoperative anemia in cardiac surgery: a multicenter cohort study. *Circulation* 2008; **117**: 478-84.
- 26) van Straten AH, Hamad MA, van Zundert AJ, et al. Preoperative hemoglobin level as a predictor of survival after coronary artery bypass grafting: a comparison with the matched general population. *Circulation* 2009; **120**: 118-25.
- 27) World Health Organization - Department of Essential Health Technologies. Blood transfusion safety. Available at: [http://www.who.int/bloodsafety/en/Blood\\_Transfusion\\_Safety.pdf](http://www.who.int/bloodsafety/en/Blood_Transfusion_Safety.pdf). Last accessed: 02/23/2010.
- 28) World Health Organisation. *The Clinical Use of Blood Handbook*. Geneva: WHO; 2005.
- 29) American Society of Anesthesiologists Task Force on Perioperative Blood Transfusion and Adjuvant Therapies. Practice guidelines for perioperative blood transfusion and adjuvant therapies: an updated report by the American Society of Anesthesiologists Task Force on Perioperative Blood Transfusion and Adjuvant Therapies. *Anesthesiology* 2006; **105**: 198-208.