

PIASTRINE: ALTERAZIONI QUALITATIVE O QUANTITATIVE

PLATELET COUNT AND PERIPROCEDURAL MAJOR BLEEDING IN CIRRHOTIC PATIENTS UNDERGOING INVASIVE PROCEDURES: INDIVIDUAL PATIENT DATA META-ANALYSIS

E. Tarasconi^{1,2}, E. Pontisso¹, M. Manzoni¹, S. Birocchi¹, B. Clerici¹, E.G. Giannini³, A. Iacobellis⁴, Shalimar⁵, P. Ponzo⁶, F. Giuliani⁷, A. Lauterio⁸, L. Massicotte⁹, N. Cocero¹⁰, V. Ronca¹¹, G.M. Podda^{1,2}

¹S.C. Medicina Generale II, Ospedale San Paolo Polo Universitario, ASST Santi Paolo e Carlo, Università degli Studi di Milano, Italy; ²Dipartimento di Scienze della Salute (DISS), Università degli Studi di Milano, Italy; ³Gastroenterology Unit, Department of Internal Medicine, University of Genoa, Italy; ⁴Department of Gastroenterology and Endoscopy, Casa Sollievo della Sofferenza, San Giovanni Rotondo, Italy; ⁵Department of Gastroenterology and Human Nutrition Unit, All India Institute of Medical Sciences, New Delhi, India; ⁶Division of Gastroenterology and Hepatology, Città della Salute e della Scienza Hospital, University of Torino, Italy; ⁷Hepatobiliary Surgery Unit, Foundation and Teaching Hospital Sacred Heart IRCCS A. Gemelli, Catholic University of the Sacred Heart, Roma, Italy; ⁸General Surgery and Abdominal Organ Transplantation, ASST Grande Ospedale Metropolitano Milano Niguarda School of Medicine and Surgery, University of Milan-Bicocca, Milano, Italy; ⁹Department of Anesthesiology, Centre Hôpitalier de l'Université de Montréal- Hôpital Saint-Luc, Montreal, Canada; ¹⁰Senior Consultant, Oral Surgery Section of the Dental School of the University of Torino at the Azienda Ospedaliera Città della Salute e della Scienza of Torino, Italy; ¹¹IRCCS Humanitas Research Hospital, Department of Gastroenterology, Division of Internal Medicine and Hepatology, Milano, Italy. E. Tarasconi and E. Pontisso contributed as co-first authors

Background and Aims. Cirrhotic patients have a fragile hemostatic balance, which can be perturbed by invasive procedures. Thrombocytopenia is often feared because of the risk of periprocedural bleeding and some guidelines recommend platelet transfusion for counts below $50 \times 10^9/L$. However, evidence supporting this practice remains conflicting. We performed an individual patient data meta-analysis to evaluate the impact of the platelet count on periprocedural bleeding in cirrhotic patients undergoing invasive procedures.

Methods. We searched Medline and Embase for randomized controlled trials and prospective and cohort studies published between 2010 and 2021 using a pre-defined research string. We included studies in English reporting on periprocedural major bleeding (ISTH definition) and post-procedural mortality in adult patients with cirrhosis undergoing laparotomic, laparoscopic or percutaneous procedures. Patients undergoing endoscopic or endovascular procedures and those receiving thrombopoietin receptor agonists were excluded. Eligible procedures were classified as high- or low-bleeding risk according to predefined criteria. Individual patient data (including platelet counts) were requested from study authors. The primary outcome of this study was the prevalence of periprocedural major bleeding.

Results. Of 585 retrieved citations, we included 9 studies, resulting in 2747 cirrhotic patients who underwent a total of 3136 eligible procedures. Eligible patients were stratified based on their platelet counts: less than $50 \times 10^9/L$ ($n=394$), 50 to $99 \times 10^9/L$ ($n=969$), and $100 \times 10^9/L$ or more ($n=1384$). Of the eligible procedures, 2135 (68%) were classified at

high bleeding risk. Overall, the prevalence of periprocedural major bleeding was 8% (243/3136). Stratifying patients by platelet count, the prevalence of periprocedural major bleeding was 8% (34/416) in patients with counts $<50 \times 10^9/L$, 9% (94/1102) in patients with counts between 50 and $99 \times 10^9/L$ and 7% (115/1618) in patients with counts $\geq 100 \times 10^9/L$, with no statistically significant differences across the groups ($p=0.37$). Stratifying the procedures based on their inherent bleeding risk, periprocedural major bleeding was significantly more prevalent in high-risk procedures (11%, 224/2135) than in low-risk procedures (2%, 19/1001) ($p<0.001$). The prevalence of major bleeding related to high-risk procedures did not significantly differ across platelet count groups ($p=0.16$). Periprocedural major bleeding occurred in 8 of 85 (9%) patients who received prophylactic platelet transfusions and in 103 of 2020 (5%) patients who did not, with no statistically significant differences between transfused and non-transfused patients ($p=0.14$) nor across platelet count groups (transfused and non-transfused patients: $p=0.94$ and $p=0.40$, respectively).

Conclusions. The results of this individual patient data meta-analysis show that cirrhotic patients' platelet counts and prophylactic platelet transfusion practices were not associated with the rates of periprocedural major bleeding. The type of invasive procedure and its inherent bleeding risk emerged as the clinical covariates most strongly associated with the occurrence of major bleeding, suggesting that bleeding risk assessment should be based on the procedure type and feasibility of local hemostasis, rather than on platelet counts alone.