# RESOLUTION OF INFECTIOUS EPISODES THROUGH SURGICAL INTERVENTIONS IN SEVERE NEUTROPENIC AND THROMBOCYTOPENIC PATIENTS

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## Introduction

Oncohematologic patients undergoing intensive treatments who develop undrained infectious foci represent a therapeutic challenge, as profound cytopenias limit surgical management. There is a marked reluctance among surgeons to perform invasive procedures in this population

## Aim

To evaluate the effectiveness and safety of surgical interventions for infectious foci in severely neutropenic and thrombocytopenic oncohematologic patients, focusing on infection resolution, hemorrhagic complications, and short-term mortality.

## Objectives

**1.** To determine the infection resolution rate in oncohematologic patients undergoing surgical procedures. **2.** To establish the rate of hemorrhagic complications. **3.** To assess overall mortality (OM) at 5 and 30 days postoperatively.

## Methods

**DESIGN:** Retrospective cohort study conducted from January 2012 to December 2020.

**SETTING:** Study conducted in a private referral center with inpatient care.

**PATIENTS:** Out of 713 patients aged over 16 years hospitalized for intensive chemotherapy regimen, Allogeneic or autologous hematopoietic cell transplantation, 94 patients with moderate to severe neutropenia (≤1000/mm³) who underwent surgery due to suspected infection were analyzed.

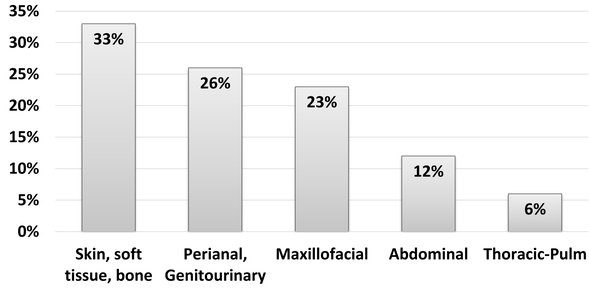
**MAIN OUTCOME MEASURES:** The primary outcomes analyzed were: infection resolution rate, postoperative hemorrhage, and OM at 5 and 30 days. Statistical analysis was performed using EasyR (version 1.3). Fisher's exact test was applied. Multivariate analyses were conducted using logistic regression and expressed as Odds Ratios (ORs) with 95% Confidence Intervals (CIs).

| Table 1: Characteristics of the Patients at Baseline | (N=113) |
|---|---|
| Media de Edad (rango) en años | 40 (16 - 74) |
| Sex no. (%) | |
| Male | 71 (63%) |
| Female | 42 (37%) |
| Patología Oncohematológica no. (%) | |
| Acute Leukemia | 71 (63%) |
| Lymphoma and Múltiple Myeloma | 27 (24%) |
| Others | 15 (13%) |
| Cause of neutropenia no. (%) | |
| Chemotherapy | 56 (49.5%) |
| Allogeneic HSCT | 35 (31%) |
| Autologous HSCT | 22 (19.5%) |
| Mean neutrophil count (/mm³) | 104.7 |
| Mean platelet count (/mm³) | 23523 |

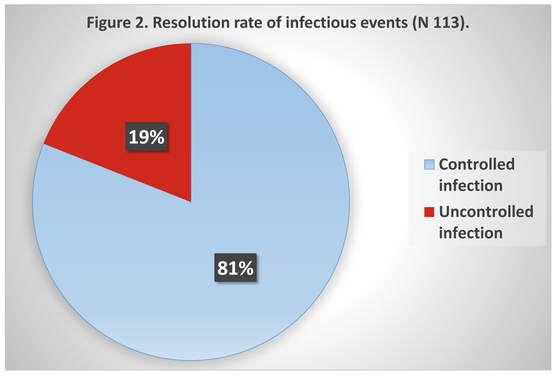
## Results

A total of 113 neutropenic infectious events requiring surgical intervention were analyzed in 94 patients. The mean neutrophil count was 105/mm³ and the mean platelet count was 23,000/mm³. The most frequently operated sites were skin, soft tissue and bone (33%), followed by the perianal-genitourinary region (26%).

**Figure 1: Description of the type of procedure according to location of infection (N 113).**




Infection was controlled in 81% of cases (95% CI: 74–88%).




OM at 5 days was 4.5% and at 30 days 14%. Multivariate analysis identified age ≥60 years (OR 0.31, p<0.01) and platelet count ≤10,000/mm³ (OR 0.34, p=0.04) as independent prognostic factors for infection resolution.

**Table 2: Multivariate analysis of resolution rate of infectious events (N 113).**

| Variable | Multivariate OR (IC 95%) | p |
|---|---|---|
| Sex Male vs Female | 0.31 (0.9 – 1.1) | 0.07 |
| Age ≥ 60 yr | 0.15 (0.2 – 0.6) | <0.01 |
| Platelet count ≤ 10000/mm3 | 0.34 (0.1 – 0.9) | 0.04 |

For 30-day OM, male sex (OR 7.02, p=0.02) and age ≥60 years (OR 13.7, p<0.01) were identified as independent risk factors. Postoperative hemorrhagic complications occurred in 8% of cases.

**Table 3: Multivariate analysis of mortality at day 30 (N 113).**

| Variable | Multivariate OR (IC 95%) | p |
|---|---|---|
| Sex Male vs Female | 7.2 (1.2 – 42) | 0.02 |
| Age ≥ 60 yr | 13.7 (2.8 – 66.2) | <0.01 |
| Platelet count ≤ 10000/mm3 | 1.6 (0.5 – 5.6) | 0.4 |

## Discussion

Surgical management of infectious foci in neutropenic patients may be a safe and effective approach. Its implementation could improve infection resolution rates and reduce mortality in this population. These findings support the consideration of early surgical intervention in oncohematologic patients with febrile neutropenia and undrained infectious foci.

## References

1. Freifeld AG, Bow EJ, Sepkowitz KA, et al. Clinical Practice Guideline for the Use of Antimicrobial Agents in Neutropenic Patients with Cancer: 2010 Update by the Infectious Diseases Society of America. Clin Infect Dis. 2011.
2. Wingard JR1, Hsu J, Hiemenz JW. Hematopoietic Stem Cell Transplantation: An Overview of Infection Risks and Epidemiology. Infect Dis Clin North Am. 2010.
3. Wandt H, Schaefer-Eckart K, Wendelin K, et al. Therapeutic platelet transfusion versus routine prophylactic transfusion in patients with haematological malignancies: an open-label, multicentre, randomised study. Lancet. 2012.
4. Kumar A, Mhaskar R, Grossman BJ, et al. Platelet transfusion: a systematic review of the clinical evidence. Transfusion. 2015.
5. Averbuch D, Bacterial Infections. In: Carreras E, Dufour C, Mohty M, et al., editors. The EBMT Handbook: Hematopoietic Stem Cell Transplantation and Cellular Therapies. 7th edition. Cham (CH): Springer; 2019. Chapter 36.
6. Gudiol C, Garcia-Vidal C, Aman M, et al. Etiology, clinical features and outcomes of pre-engraftment and post-engraftment bloodstream infection in hematopoietic SCT recipients. Bone Marrow Transplant. 2014.
7. Labrador J, Lopez-Anglada L, Perez-Lopez E, et al. Analysis of incidence, risk factors and clinical outcome of thromboembolic and bleeding events in 431 allogeneic hematopoietic stem cell transplantation recipients. Haematologica. 2013.
8. Jolissaint JS, Harary M, Saadat LV, et al. Timing and Outcomes of Abdominal Surgery in Neutropenic Patients. J Gastrointest Surg. 2019.
9. Mokart D, Penalver M, Chow-Chine L, et al. Surgical treatment of acute abdominal complications in hematology patients: outcomes and prognostic factors. Leuk Lymphoma. 2017.
10. Cortés JA, Cuervo S, Gómez CA, Bermúdez D, Martínez T, Arroyo P. Febrile neutropenia in the tropics: a description of clinical and microbiological findings and their impact on inappropriate therapy currently used at an oncological reference center in Colombia. Biomedica. 2013
11. Sammon JD, Klett DE, Sood A, et al. Sepsis after major cancer surgery. J Surg Res. 2015.
12. Bishop JF, Schiffer CA, Aisner J, Matthews JP, Wiernik PH. Surgery in acute leukemia: a review of 167 operations in thrombocytopenic patients. Am J Hematol. 1987.
13. Muegge J, de Waren T, Saltzman D, Hess D. Preoperative platelet transfusions: A retrospective review of pediatric patients with thrombocytopenia, 2011-2016. J Pediatr Surg. 2021.
14. Spyropoulos AC, Brohi, K, Caprini, J, et al. Scientific and Standardization Committee Communication: Guidance document on the perioprocedural management of patients on chronic oral anticoagulant therapy: Recommendations for standardized reporting of procedural/surgical bleed risk and patient-specific thromboembolic risk. J Thromb Haemost. 2019.