# Current Epidemiology of Bacteremia in Patients with Hematological Malignancies and Hematopoietic Stem Cell Transplantation and the Impact of Antibiotic Resistance on Survival

Herrera F[1], Laborde A[2], Jordán R[3], Berruezo L[4], Roccia Rossi I[5], Valledor A[6], Lambert S[7], Pereyra M[8], Nenna A[9], Dictar M[10], Costantini P[11], Benso J[12], Carena A[1], Gonzalez Ibañez M[2], Eusebio M[3], Baldoni N[4], Lovano F[5], Barcán L[6], Tula L[7], Racioppi A[10], Luck M[11], Pasterán F[13], Corso A[13], Rapoport M[13], Nicola F[1], García Damiano M[2], Monge R[3], Carbone R[4], Reynaldi M[5], Greco G[6], Blanco M[7], Vilches V[8], Chaves M[9], Valle S[10], Bronzi M[11], Torres D[1].

**The Argentine Group for the Study of Bacteremia in Cancer and Stem Cell Transplant**



**1.** Hospital Universitario CEMIC, **2.** FUNDALEU, **3.** Hospital Británico de Buenos Aires, **4.** HIGA Dr. Rodolfo Rossi, **5.** HIGA San Martín, **6.** Hospital Italiano de Buenos Aires, **7.** Hospital "El Cruce" Alta Complejidad en Red, **8.** Hospital Universitario Austral, **9.** Hospital Municipal de Oncología Marie Curie, **10.** Instituto Alexander Fleming, **11.** Hospital de Oncología Angel Roffo, **12.** Hospital Italiano de Buenos Aires (San Justo), **13.** INEI-ANLIS Dr. Carlos Malbrán

**Buenos Aires - Argentina**

31st ECCMID EUROPEAN CONGRESS OF CLINICAL MICROBIOLOGY AND INFECTIOUS DISEASES
Online 9 – 12 July 2021

# Disclosures

- Dr. Fabián Herrera:
  - Speaker and advisory board:
    - Pfizer
    - MSD
  - Education and research grant:
    - Pfizer

Online
9 – 12 July 2021
31st ECCMID
EUROPEAN CONGRESS OF CLINICAL MICROBIOLOGY AND INFECTIOUS DISEASES

# Background

- The etiology of bacteremia and antibiotic resistance patterns (ARP) in patients with hematological malignancies (HM) and hematopoietic stem cell transplantation (HSCT) differ according to region.

- Our purpose was to describe the etiology of bacteremia and the ARP of gram-negative bacilli (GNB) in HM and HSCT patients and to assess the impact of multidrug-resistant organisms (MDRO) on survival.

Online
9 – 12 July 2021
31st ECCMID EUROPEAN CONGRESS OF CLINICAL MICROBIOLOGY AND INFECTIOUS DISEASES

# Material & Methods

- Prospective, observational and multicenter study carried out in 12 centers of Argentina, from May 2014 to January 2020.
- The first episodes of bacteremia during hospitalization in adult patients with HM and HSCT were included.
- Clinical features, microbiological characteristics, resistance profile and outcome were compared between HM and HSCT patients.
- To identify risk factors for 30-day mortality (RFM) we performed a logistic regression model for multivariate analysis.

31st ECCMID EUROPEAN CONGRESS OF CLINICAL MICROBIOLOGY AND INFECTIOUS DISEASES
Online 9 – 12 July 2021

# **Results:** Baseline Characteristics

- **1277 episodes** were included: **HM** 920, **HSCT** 357 (Autologous 57%, Allogeneic 43%).

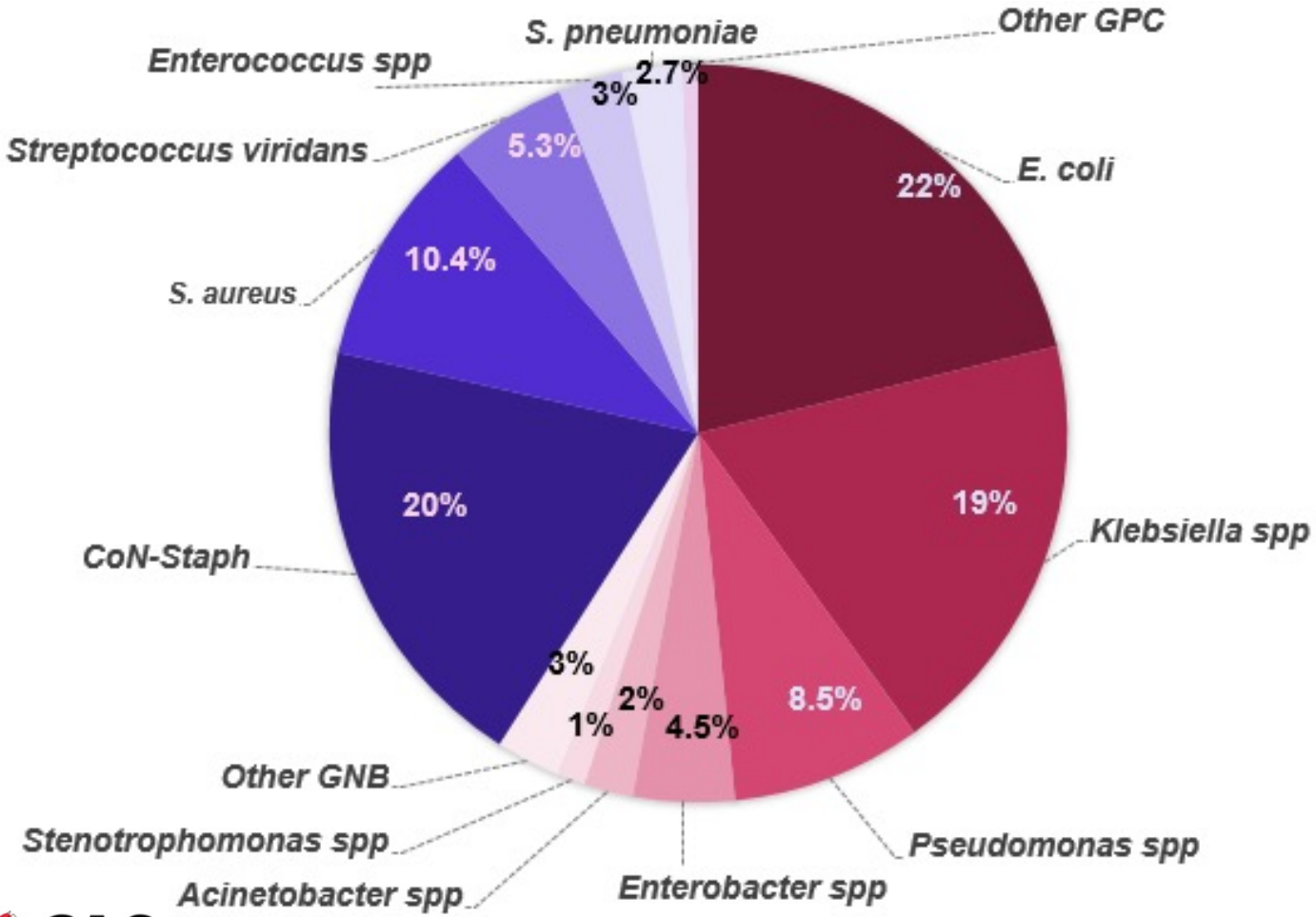
| Variable | All | HM | HSCT | *p* |
|---|---|---|---|---|
| **Age** - Median (ICR) | 52 (37-63) | 53 (37-64) | 50 (37-59) | 0.002 |
| **Male gender** - n (%) | 743 (58) | 508 (55.2) | 235 (65.8) | 0.001 |
| | | | | |
| **Acute Leukemia** - n (%) | 598 (46.8) | 486 (52.8) | 112 (31.4) | <0.0001 |
| **Lymphoma** - n (%) | 395 (30.9) | 278 (30.2) | 117 (32.8) | 0.375 |
| **Multiple Myeloma** - n (%) | 159 (12.4) | 65 (7.1) | 94 (26.3) | <0.0001 |
| **Neutropenia** - n (%) | 924 (72.3) | 638 (69.3) | 286 (80.1) | <0.0001 |
| **Recent diagnosis** – n (%) | 390 (30.5) | 379 (41.2) | 11 (3.1) | <0.0001 |
| **Complete remission** - n (%) | 333 (26.1) | 124 (13.5) | 209 (58.5) | <0.0001 |
| **Partial remission** – n (%) | 142 (11.1) | 85 (9.2) | 57 (16) | 0.001 |
| **Relapse** – n (%) | 292 (22.9) | 237 (25.8) | 55 (15.4) | <0.0001 |
| **Refractory disease** – n (%) | 121 (9.5) | 95 (10.3) | 26 (7.3) | 0.096 |

ROCAS

Online
9 – 12 July 2021
31st ECCMID
EUROPEAN CONGRESS OF CLINICAL MICROBIOLOGY AND INFECTIOUS DISEASES

# **Results:** Etiology

- 60.3% GNB, 41.9% GPC, 6.5% Polymicrobial.

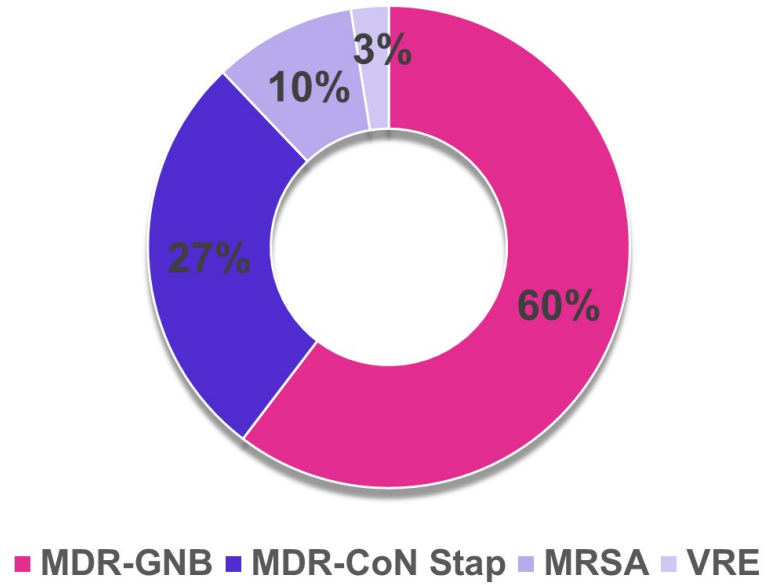



ROCAS

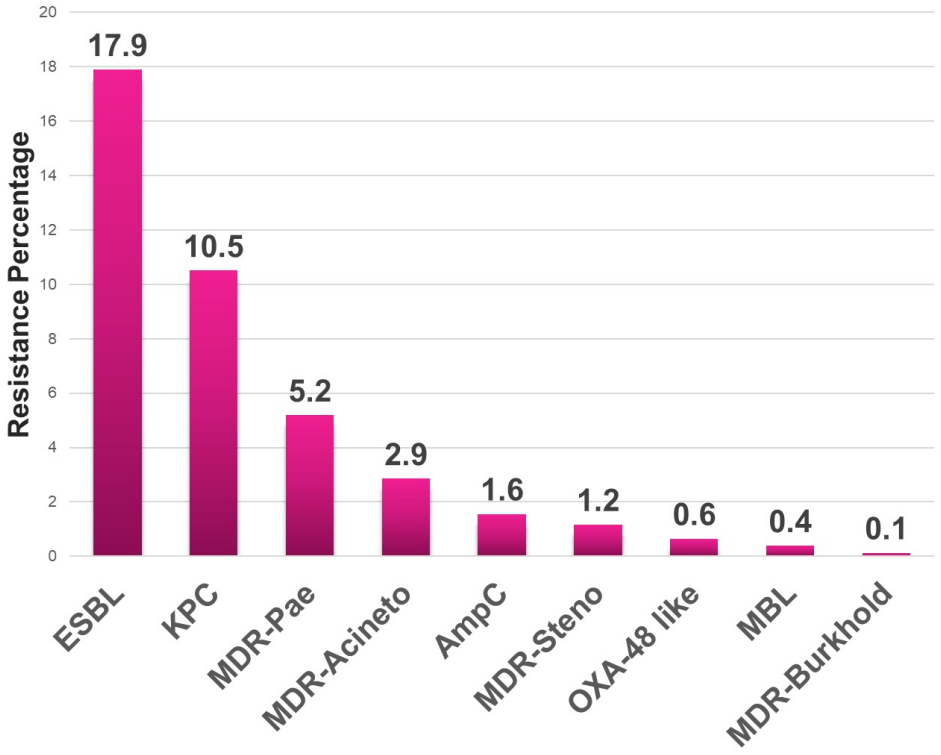
# **Results:** Resistance Profile

- **MDRO:** 40.2% → **HM** 38.5% vs **HSCT** 44.8% (*p*= 0.03)

## Type of MDRO




## Resistance Phenotype in GNB

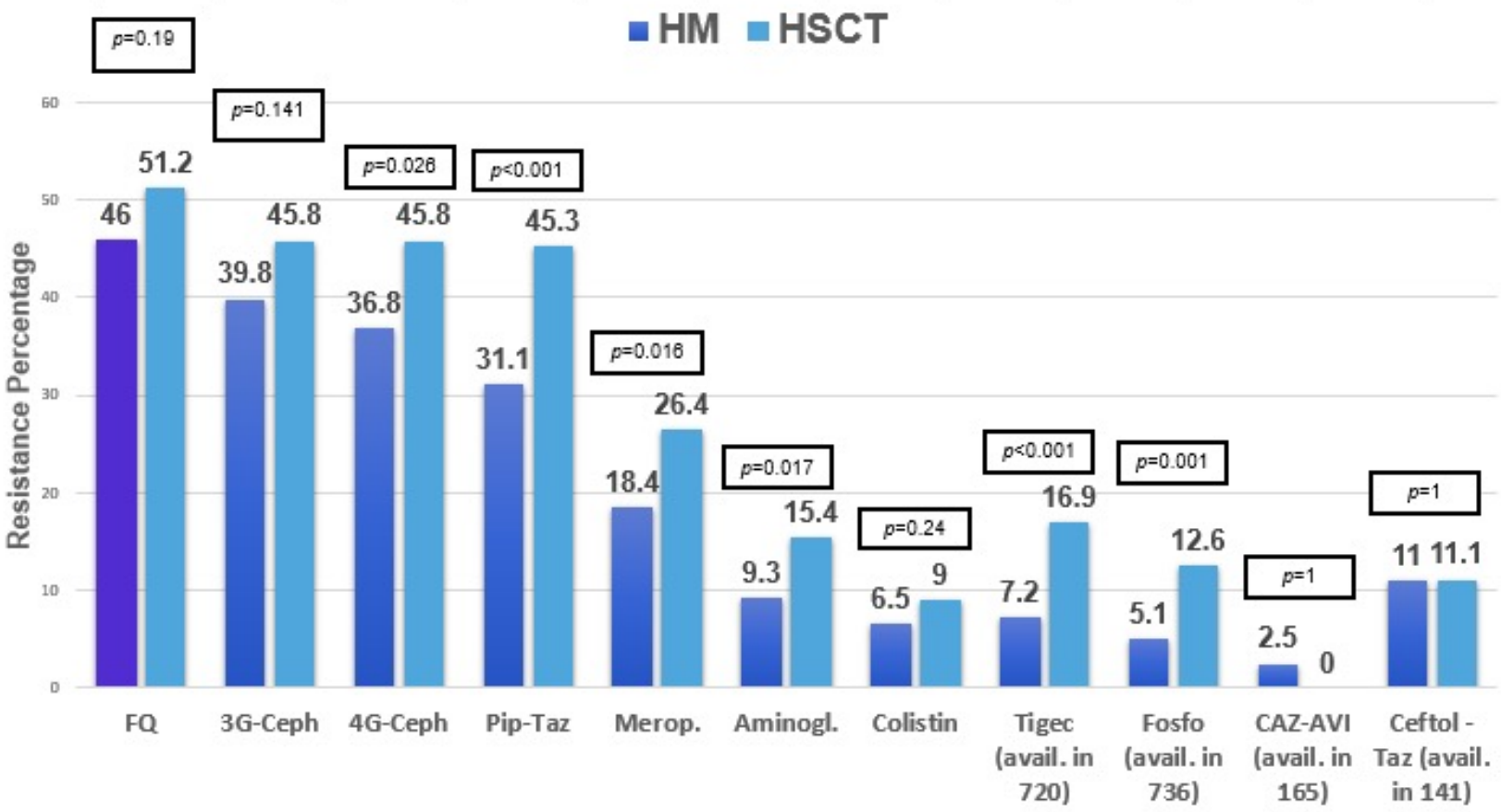



ROCAS

Online
9 – 12 July 2021

31st ECCMID EUROPEAN CONGRESS OF CLINICAL MICROBIOLOGY AND INFECTIOUS DISEASES

# **Results:** Antibiotic Resistance in GNB




ROCAS

Registro Argentino de Bacteriemias por Organismos Multiresistentes en Pacientes con Cáncer y Trasplante de Células Progenitoras Hematopoyéticas


Online
9 – 12 July 2021

31st ECCMID EUROPEAN CONGRESS OF CLINICAL MICROBIOLOGY AND INFECTIOUS DISEASES

# **Results:** Clinical Features

| Variable | All | HM | HSCT | *p* |
|---|---|---|---|---|
| **Clinical source** – n (%) | 916 (71.7) | 641 (69.7) | 275 (77) | 0.009 |
| Catheter source - n (%) | 358 (28) | 227 (24.7) | 131 (36.7) | <0.0001 |
| Abdominal source – n (%) | 214 (16.7) | 149 (16.2) | 65 (18.2) | 0.388 |
| Respiratory source – n (%) | 118 (9.2) | 92 (10) | 26 (7.3) | 0.132 |
| | | | | |
| **Hypotension** – n (%) | 309 (23.8) | 215 (23.4) | 89 (24.9) | 0.557 |
| **ICU admission** – n (%) | 247 (19.3) | 178 (19.3) | 69 (19.3) | 0.993 |
| **Septic Shock** – n (%) | 227 (17.8) | 166 (18) | 61 (17.1) | 0.688 |
| **Multiple Organ Failure** – (n%) | 177 (13.4) | 120 (13) | 57 (16) | 0.175 |
| | | | | |
| **7-day Mortality** – n (%) | 125 (9.8) | 92 (10) | 33 (9.2) | 0.683 |
| **30-day Mortality** – n (%) | 224 (17.5) | 171 (17.5) | 63 (17.6) | 0.951 |

ROCAS

Online
9 – 12 July 2021
31st ECCMID
EUROPEAN CONGRESS OF CLINICAL MICROBIOLOGY AND INFECTIOUS DISEASES

# **Results:** Risk Factors for 30-day Mortality

| Variable | Multivariate analysis OR (95%CI) | *p* |
|---|---|---|
| **Relapse disease** | 1.58 (1.1-2.1) | 0.005 |
| **Refractory disease** | 1.78 (1.2-2.6) | 0.002 |
| **Respiratory source** | 1.8 (1.2-2.6) | 0.002 |
| **Nosocomial infection** | 1.69 (1.1-2.5) | 0.01 |
| **ICU admission** | 1.69 (1.07-2.6) | 0.025 |
| **Shock** | 3.1 (1.9-5) | 0.0001 |
| **PITT score ≥ 4** | 1.5 (1.04-2.2) | 0.03 |
| **GNB Resistant to Carbapenems** | 1.89 (1.1-3.1) | 0.015 |
| **7-day clinical response** | 0.1 (0.07-0.15) | 0.0001 |

ROCAS

Online
9 – 12 July 2021
31st ECCMID EUROPEAN CONGRESS OF CLINICAL MICROBIOLOGY AND INFECTIOUS DISEASES

# Conclusion

- Bacteremia in patients with hematological malignancies and HSCT was frequently caused by GNB, with a high proportion of MDRO (especially in HSCT).
- Carbapenem-resistant GNB bacteremia significantly increased mortality.
- It is essential to identify patients at risk and treat them properly.

31st ECCMID EUROPEAN CONGRESS OF CLINICAL MICROBIOLOGY AND INFECTIOUS DISEASES
Online 9 – 12 July 2021