

# MRSA infected wounds in a community hospital in rural tropical Ecuador

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## Abstract

**Introduction:** Although community acquired MRSA has been well described in many areas around the globe, little information is available about the prevalence of MRSA infections in rural areas of the Andean Region of South America. This study characterizes wound infections from a rural community hospital in Ecuador.

**Methods:** A retrospective review of 235 bacterial isolates from infected wounds that included wound type, site, gender, etc...

**Results:** Ninety-two (39.1%) isolates were *Staphylococcus aureus*. Of these, forty-two (44.7%) were methicillin resistant *S. aureus* (MRSA).

**Conclusion:** community acquired MRSA wound infections rates appear to warrant the use of empiric antibiotics that cover MRSA infections. If wound infections reflect a bacterial epidemiology similar to that of skin and soft tissues infections, empiric anti-MRSA antibiotic coverage is also warranted. In Ecuador, national antibiotic guidelines do not provide for such empiric coverage.

## Heridas infectadas por MRSA en un hospital comunitario en una zona rural de Ecuador tropical

### Resumen

**Introducción:** Aunque el MRSA adquirido en la comunidad ha sido bien descrito en muchas áreas alrededor del mundo, hay poca información disponible sobre la prevalencia de infecciones por MRSA en áreas rurales de la Región Andina de América del Sur. Este estudio caracteriza las infecciones de heridas de un hospital comunitario rural en Ecuador.

**Métodos:** una revisión retrospectiva de 235 aislamientos bacterianos de heridas infectadas que incluyeron el tipo de herida, el sitio, el sexo, etc.

**Resultados:** Noventa y dos (39,1%) aislamientos fueron *Staphylococcus aureus*. De estos, cuarenta y dos (44,7%) eran *S. aureus* resistente a la metilina (MRSA).

**Conclusión:** las tasas de infecciones de heridas por MRSA adquiridas en la comunidad parecen justificar el uso de antibióticos empíricos que cubren las infecciones por MRSA. Si las infecciones de heridas reflejan una epidemiología bacteriana similar a la de las infecciones de piel y tejidos blandos, también se justifica la cobertura empírica de antibióticos anti-MRSA. En Ecuador, las guías nacionales de antibióticos no contemplan tal cobertura empírica.

## Background

*Staphylococcus aureus* is a bacterium that causes life-threatening infections in healthcare and in the community. Historically associated with hospital settings, in 1999 an outbreak of Methicillin resistant Staph aureus (MRSA) associated with the USA300 clone in a state prison in Mississippi, USA, marked the beginning of the community acquired MRSA outbreak (1). By 2004, MRSA became the major cause of skin and soft tissue infections (SSTI) in the United States (2).

The USA300 Latin American variant (USA300-LV) was first identified in 2005, disseminating through communities and hospitals in Colombia, Ecuador and Venezuela (3) (4) (5). Interestingly, it has been demonstrated that the South American epidemic is not an extension of the North American epidemic, but rather were concurrent, with the two variants showing a common ancestor (6). Of note, a different MRSA isolate was identified in Uruguay during a community-associated MRSA outbreak in 2003 (7).

This study reviews the bacterial epidemiology of wound infections at a rural hospital in a poor community in rural, tropical Ecuador

## Methodology

Bacterial isolates and their resistance patterns from wound cultures from 2014-2017 were reviewed retrospectively with no knowledge of patient identification. *S. aureus* isolates were studied to determine rates of MRSA and their specific resistance patterns.

## Results

235 bacterial isolates were reviewed from various wound sources. (tabla 1)

**Tabla 1. Anatomic distribution of bacterial isolates**

UBICACIÓN ANATOMICA	NUMERO DE AISLAMIENTOS	PORCENTAJE %
PIES	56	23.8
PIERNAS	55	23.4
MANOS	20	8.5
QUIRURGICA ABDOMINAL	18	7.7
NO ESPECIFICA	14	6.0
CABEZA	13	5.5
GLUTEO	10	4.3
SURCO BALANO PREPUCIAL	9	3.8
BRAZO	5	2.1
ESPALDA	5	2.1
PELVIS	5	2.1
TORAX	5	2.1
AXILA	4	1.7
QUEMADURA	4	1.7
PERIANAL	3	1.3
ESCROTO	2	0.9
MAMA	2	0.9
QUIRUGICA EXTREMIDADES	2	0.9
CUELLO	1	0.4
GLANDULA BARTOLINO	1	0.4
PERIODONTAL	1	0.4
TOTAL	235	100.0

92 of these isolates were *S. aureus*. (table 2) 42 were identified as MRSA with their respective resistance patterns. (table 3)

**Tabla 2. Resultados de pruebas de sensibilidad en *S. aureus* en heridas**

ANTIBIOTICO	CONCENTRACION (mg/dL)	AISLADOS SENSIBLES	AISLADOS INTERMEDIOS	AISLADOS RESISTENTES	PORCENT RESISTE
AMPICILINA	10	11	0	83	88.3
OXACILINA	1	52	0	42	44.7
CEFOXITIN	30	52	0	42	44.7
ERITROMICINA	15	68	1	25	26.6
AZITROMICINA	15	68	1	25	26.6
TRIMETOPRIM-SULFAMETOXAZOL	25	70	1	23	24.5
DOXICICLINA	30	77	0	17	18.1
CLINDAMICINA	2	79	0	15	16.0
CIPROFLOXACINA	5	87	0	7	7.4
LEVOFLOXACINA	5	87	0	7	7.4
RIFAMPICINA	5	91	0	3	3.2
GENTAMICINA	10	91	1	2	2.1
NETILMICINA	30	91	1	2	2.1
LINEZOLID	30	94	0	0	0.0
VANCOMICINA	30	94	0	0	0.0

**Tabla 3. Patron de resistencia de 42 aislamientos de MRSA de heridas**

MRSA RESISTENCIA	42 AISLAMIENTOS	
	ANTIBIOTICO	NUMERO DE CASOS
AMPICILINA	42	100.0
TRIMETOPRIM-SULFAMETOXAZOL	21	50.0
DOXICICLINA	17	40.5
AZITROMICINA	13	31.0
ERITROMICINA	13	31.0
CLINDAMICINA	7	16.7
CIPROFLOXACINA	5	11.9
GENTAMICINA	2	4.8
VANCOMICINA	0	0.0
LINEZOLID	0	0.0

## Discussion

These results reveal that MRSA is an important pathogen responsible for wound infections in this rural community. Further studies are required to determine how this pathogen has become widely disseminated in this area. This resistant bacteria requires attention when discussing treatment options, as the usual antibiotics used for wound infections of the skin include first generation cephalosporins and antistaphylococcal penicillins such as dicloxacillin. In this region of Ecuador, anecdotally, amoxicillin is also used considerably. Most wound infections are not cultured, so informed empiric therapeutic decisions are critical.

In other areas of the world, such as the USA, there is significant sensibility to TMP-Sulfa and to Doxycycline, however this small report suggests that with a 50% and 40% resistance rate respectively, these antibiotics might not be appropriate. Conversely, inducible Clindamycin resistance in other parts of the world is growing, but this study shows a smaller percentage of MRSA resistance to Clindamycin than to TMP-Sulfa and Doxycycline.

Ecuador's National Health Council's (CONASA) National Table of Basic Medications and National Therapeutic Registry (Cuadro Nacional de Medicamentos Basicos), ninth revision, 2014, does not expressly recommend the use of certain oral antibiotics, known to be more effective against MRSA skin and soft tissue infections (8). This study would suggest that these recommendations might require updating.

## Conclusiones

MRSA is an important causes of wound infections in a small rural tropical community in Ecuador. Further studies are required to determine the role of this concerning bacteria in skin and wound infections, and to determine what antibiotics demonstrate utility against MRSA in this community. Current ministry of public health recommendations for treating skin and soft tissue infections might require updating to take into account this worrisome bacteria.

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