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## Research Articles

# An analysis of microorganisms isolated from wound cultures in pediatric cases

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## Abstract

**Introduction:** Nowadays, thanks to the advancements in the follow-ups and treatments of diseases, more patients have been hospitalized. Especially chronic diseases such as cancers, increases infection risk. Although there is not much data in the literature about wound cultures in pediatric cases, it was found that wound infection has most commonly seen in the departments of general surgery and pediatric clinics respectively, as expected. Therefore, it is essential to know the microorganisms isolated from wounds in pediatric cases in terms of empirical treatment.

In this study, we aim to evaluate microorganisms isolated from wound cultures in pediatric cases retrospectively.

**Materials and methods:** Specimens accepted to the Medical Microbiology laboratory from the samples taken from the wound infections in the pediatric clinic of Necmettin Erbakan University Meram Faculty of Medicine Hospital between 01.01.2016 and 31.12.2018 were included in the study. Routinely, blood agar and Eosin methylene blue (EMB) agar were cultured at 37°C for 24 hours in an aerobic environment. Anaerobic cultures were not routinely done. Microorganisms growth and thought to be active in cultures have been identified by conventional methods and MALDI-TOF MS system/VITEC MS system (Bio Merieux, France).

**Results:** Of the 45 microorganisms isolated from wound cultures, the most frequent one was *Pseudomonas aeruginosa* with 35.5% of them (n=16). Speaking of other species, 20% were *Acinetobacter baumannii* (n=9), 13.3% were *Candida spp.* (n=6), 11% were *Klebsiella pneumoniae* (n=5), 8.8% were *Escherichia coli* (n=4), 8.8% were *Staphylococcus aureus* (n=4) and 2.2% were *Achromobacter denitrificans* (n=1).

**Conclusion:** Consequently, it was concluded that *P. aeruginosa* and *A. baumannii* were the most common germs growth in wound cultures. Hence this fact should be taken into consideration while starting empiric antibiotherapy to children with wound infection.

It is common information that isolated microorganisms may differentiate according to studying center and laboratories.

## Introduction

Nowadays, more patients have been hospitalized with thanks to the advancements in the follow-ups and treatments of diseases. Infections are more frequently observed in hospitals with the increase of inpatients. Especially chronic diseases such as cancers, increases infection risk. In addition to long term hospitalizations for the treatment of diseases present in many patients with chronic diseases, they also increase the risk of infection development; especially in patients with immune deficiency and/or poor general status. These infections significantly affect morbidity and mortality,

too. Bacteria are often blamed as infectious agents. Therefore, it has a great importance to know the frequency of infectious agents in patient groups in terms of follow-up and treatment [1-3].

Wound infections are important in follow-ups. Wound infections occur as a result of microorganisms settling and spreading by defeating the immune response [1-3]. These infections vary greatly in terms of both the clinical picture and responsible microorganisms [4]. Wound infections are one of the most common comorbid problems, especially in cases with surgery. But they are generally an important health issue in developing countries [5,6].



Although there is not much data in the literature about wound cultures in pediatric cases, it was found that wound infection has most commonly seen in the departments of general surgery and pediatric clinics respectively, as expected [7]. Therefore, it is essential to know the microorganisms isolated from wounds in pediatric cases in terms of empirical treatment.

In this study, we aim to evaluate microorganisms isolated from wound cultures in pediatric cases retrospectively.

## Materials and methods

Specimens accepted to the Medical Microbiology laboratory from the samples taken from the wound infections in the pediatric department of Necmettin Erbakan University Meram Faculty of Medicine Hospital between 01.01.2016 and 31.12.2018 were included in the study. Routinely, blood agar and Eosin methylene blue (EMB) agar were cultured at 37°C for 24 hours in an aerobic environment. Anaerobic cultures were not routinely done. Microorganisms growth and thought to be active in cultures have been identified by conventional methods and MALDI-TOF MS system/VITEC MS system (Bio Merieux, France).

## Results

A total of 45 patients were included in the study. Demographic data of the patients who are included study are given in the Table 1. Bacteria were isolated in Intensive Care Unit patients, mostly. Distributions of samples isolated the bacteria according to department are given in the Table 2. Bacteria were most frequently isolated in tracheostomy area open wound. The rates of bacteria isolated by location are given in Table 3.

Of the 45 microorganisms isolated from wound cultures, the most frequent one was *Pseudomonas aeruginosa* with

35.5% of them (n=16). Speaking of other species, 20% were *Acinetobacter baumannii* (n=9), 13.3% were *Candida spp.* (n=6), 11% were *Klebsiella pneumoniae* (n=5), 8.8% were *Escherichia coli* (n=4), 8.8% were *Staphylococcus aureus* (n=4) and 2.2% were *Achromobacter denitrificans* (n=1). The microorganisms isolated according to years shows in Table 4.

## Discussion

Defining the factors of nosocomial infections and starting appropriate empiric ant bioterapy is a crucial step of the treatment. The most important step is cultivation and antibiogram. Wound culture is also one of them. However, it may not always be possible to identify the responsible agent of infection, and also sometimes treatment may be urgent and required without waiting for the culture result. Thus, it is important to know the regional infectious agents.

There are several studies investigating the site of wound infection in children. In a study, *Escherichia coli* (28.5%) was the first among the isolated microorganisms; followed by *Enterobacter aerogenes* (15.6%), *S. aureus* (14.8%) and *P. aeruginosa* (14%) [7]. In a study performed in the pediatric burn unit of Şişli Etfal Training and Research Hospital, *P. aeruginosa* (%38.1) was the most common one, then *Candida spp.* (%19.0) and *S. aureus* were isolated. This was followed by *Klebsiella pneumoniae* and other microorganisms [8]. In another study, *Pseudomonas aeruginosa* was most commonly isolated as wound site infections. Other factors followed this [9]. In our study, *P. aeruginosa* and *A. baumannii* were isolated in more than 50% of wound cultures, and *Candida spp.* isolated.

As a result, it was concluded that *P. aeruginosa* and *A. baumannii* were most common in wound infections and proper ant bioterapy should be taken into consideration.

However, wound areas are generally interventional operations. So operations must be avoided when possible.

**Table 1:** Demographic data of the patients who are included study.

	Gender		Total	Age				Total
	Male	Female		<6	6-10	10-15	15<	
2016 n-%	8 - 53,33%	7 - 46,66%	15	9 - 60%	-	6 - 40%	-	15
2017 n-%	5 - 38,46%	8 - 61,53%	13	6 - 46,15%	-	3 - 23,07%	4 - 30,76%	13
2018 n-%	9 - 52,94%	8 - 47,05%	17	7- 41,17%	2 - 11,76%	3 - 17,64%	5 - 29,41%	17
TOTAL	22 - 48,88%	23 - 51,11%	45	22 - 48,88%	2 - 4,44%	12 - 26,66%	9 - 20%	45

**Table 2:** Distributions of samples isolated the bacteria according to department.

		2016 n-%	2017 n-%	2018 n-%	TOTAL n-%
Department	Intensive Care Unite	6 - 40%	4 - 30,76%	10 - 58,82%	20-44,44%
	Pediatrics Neurology	-	-	1 - 5,88%	1 - 2,22%
	Pediatrics Infectious Disease	6 - 40%	2 - 15,38%	1 - 5,88%	9 - 20%
	Pediatric Endocrinology	-	1 - 7,69%	-	1 - 2,22%
	Pediatric Hematology And Oncology	2 - 13,33%	6 - 46,15%	-	8 - 17,77%
	Pediatric Nefrology	-	-	2 - 11,76%	2 - 4,44%
	Neonatology Unit	1 - 6,66%	-	2 - 11,76%	3 - 6,66%
	Pediatric Chest Disease	-	-	1 - 5,88%	1 - 2,22%
Total		15	13	17	45

**Table 3:** The rates of bacteria isolated by location.

Wound Area	Tracheostomy Area Open Wound	6 – 40%	1 – 7,69%	5 – 29,41%	12 – 26,66%
	Postoperative Open Wound	2 – 13,33%	-	1 – 5,88%	3 – 6,66%
	Gastrostomy Area Open Wound	3 – 20%	3 – 23,07%	3 – 17,64%	9 – 20%
	Spontan Open Wound	1 – 6,66%	-		1 – 2,22%
	Decubitus Ulcer	-	4 – 30,76%		4 – 8,88%
	Developing After Traffic Accident Open Wound	-	-	3 – 17,64%	3 – 6,66%
	Wound To The Catheter	-	1 – 7,69%	3 – 17,64%	4 – 8,88%
	Abscess	-	1 – 7,69%	2 – 11,76%	3 – 6,66%
	From Ectima Gangrenosum Lesion	-	2 – 15,38%	-	2 – 4,44%
	Unknown	3 – 20%	1 – 7,69%		4 – 4,44%
Total	15	13	17	45	

**Table 4:** The microorganisms isolated according to years.

Isolated microorganisms	2016 year n-%	2017 year n-%	2018 year n-%	Total n-%
<i>P. aeruginosa</i>	6 - 40%	3-23.07%	7- 41.17%	16 – 35.5%
<i>A. baumannii</i>	4 – 26.66%	-	5-29.41%	9 - 20%
<i>Candida spp.</i>	2 – 13.33%	2-15.38%	2-11.76%	6 – 13.3%
<i>K. pneumoniae</i>	1 – 6.66%	3-23.07%	1-5.88%	5 – 11%
<i>E. coli</i>	1 - 6.66%	3-23.07%	-	4 – 8.8%
<i>S. aureus</i>	-	2-15.38%	2 -11.76%	4 - 8.8%
<i>A.denitrificans</i>	1 – 6.66%	-	-	1 - 2.2%
Total	15	13	17	45

Especially, patients should be careful when entering the hospital environment after operations.

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