

# Elizabethkingia meningoseptica Outbreak In An Adult Hemodialysis Unit - Outbreak Investigation And Intervention Analysis

Sreejesh.B<sup>1</sup>, Pressy Sankar<sup>2</sup>, Shareek.P.S<sup>3</sup>, Jayaprakash Nath<sup>4</sup>, Ramdas Pisharody<sup>5</sup>  
SUT Hospital, Pattom, Thiruvananthapuram, Kerala, India

## INTRODUCTION

Elizabethkingia meningoseptica (EKM), is a medically important gram negative bacillus, classically associated with outbreaks of neonatal meningitis. Though an environmental inhabitant with a special liking for moist areas and contaminated water sources, it is an uncommon pathogen in humans. Of late there are reports of outbreak of this organism in critical areas including ICUs, dialysis and chemotherapy units leading onto increased morbidity and mortality.

## OBJECTIVES

- 1.To carry out outbreak investigation looking at the probable source/ sources of the EKM CRBSI ( catheter related blood stream infection) outbreak in the study centre.
- 2.To study the effectiveness of intervention measures on the prevention of further outbreaks.

## METHODS

**SETTING:** The centre is a tertiary care hospital in southern India with an eight bedded hemodialysis unit carrying out around 500 hemodialysis sessions per month. The centre practices re-use policy for both hemodialyzers and tubings by manual washing and disinfection aimed at reducing the cost in a resource poor setting. The unit follows standard infection prevention measures and regular auditing supervised by the hospital infection prevention department.

**OUTBREAK:** From September 2015 to May 2016 a total six cases of catheter related blood stream infection due to Elizabethkingia meningoseptica were reported among 24 patients undergoing regular maintenance hemodialysis via central catheters. Five of these patients were using cuffed tunnelled catheters and one was using non cuffed temporary catheter because of recent fistula failure. None of the patients with AV-Fistula as their dialysis access developed bacteremia during this period.

**MICROBIOLOGICAL PROFILE:** Blood cultures from central venous catheter and peripheral veins grew gram negative, non-lactose fermenting bacilli, biochemical reactions consistent with EKM, further identified by Vitek 2 compact as EKM in all the six patients with the same antibiotic sensitivity pattern. All the patients were treated with Vancomycin and Levofloxacin for a period of 3 weeks coupled with Levofloxacin & Heparin catheter locks.

**CLINICAL OUTCOME:** Five out of six patients had complete cure, with one mortality(16% mortality rate). Catheters could be salvaged in 3 of the 5 patients with cuffed tunnelled catheters and was re-sited in one as the patient developed septic shock. Temporary catheter was pulled out immediately in the patient with temporary dialysis catheter.

**OUTBREAK INVESTIGATION:** Epidemic of this unusual pathogen prompted an outbreak investigation.

- 1) Environmental surveillance: Samples were collected from raw water, RO treated water, dialysis ports, dialysate, dialyzer wash area, sinks, storage and dialyzer storage areas.
- 2) Hand hygiene practices and infection control measures in the dialysis unit were audited.

Microbiological purity of treated water was found to be in accordance with AAMI (Association for the Advancement of Medical Instrumentation) standards.

Auditing of infection control practices showed good adherence to standard practices.

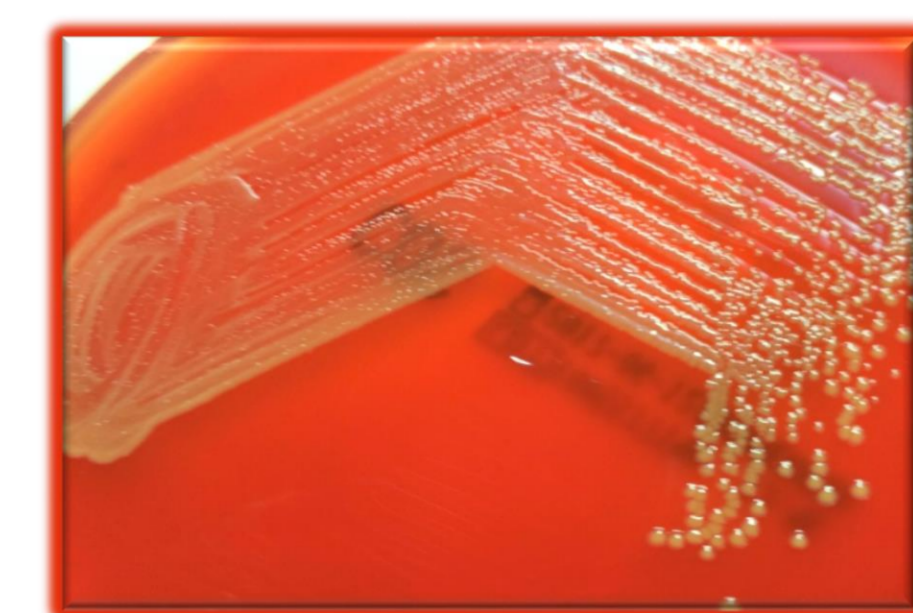
Swabs taken from dialyzer storage racks and some of the stored tubings grew EKM.

**ANALYSIS:** Industry supplied dialyzer racks for storing washed dialyzers & tubings had an enclosed design which keeps the racks moist most of the time and may allow the growth of EKM.

The use of dialysis tubings stored in these closed racks may lead to migration of organisms into the catheter hub and subsequently into the blood stream.



Closed dialyzer racks



EKM colonies

**DESIGN OF INTERVENTION MEASURES:** A prospective study was carried out from June 2016 to January 2017 in the unit with new intervention measures.

1. Practice of single use of disposable tubings for patients with central catheters
2. Lids of dialyzer racks to be kept open rather than closed to allow for faster drying.
3. Regular cleaning of racks with sterile dry clothes and fumispray (Ethanol IP 10.0% w/w; 2-Propanol IP 9.0% w/w).

## RESULTS

Swabs taken from dialyzer storage racks and some of the tubings grew EKM thus establishing them as the source of outbreak.

No case of catheter related bacteremia was reported during the study period after the institution of intervention measures.

Environmental surveillance samples collected from all areas including dialyzer racks were repeatedly negative for eight consecutive months.

**ECONOMIC OUTCOME:** New practice of single use tubings resulted in additional financial burden of 15 euros per month, while the cost of therapy for EKM bacteremia is between 200 euros (out patient therapy) - 800 euros (in patient therapy)

## CONCLUSION

- 1) Centres practicing reuse policy should be vigilant enough to prevent outbreaks of Elizabethkingia meningoseptica and defer from using enclosed storage racks for washed dialyzers and tubings as it may promote growth of such organisms.
- 2) Practice of single use tubings is a cost effective method of reducing the incidence of catheter related bacteremia along with standard infection control measures in centres practicing dialyzer reuse programme.

TOPIC: DIALYSIS – VASCULAR ACCESS II

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