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ROLE OF ACINETOBACTER IN CONTAMINATING HOSPITAL ENVIRONMENT AND MEASURES TO PREVENT INFECTIONS

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ABSTRACT

Acinetobacter infections are increasing day by day in Intensive care unit patients. Acinetobacter infections most often involve the respiratory tract of intubated patients and Acinetobacter pneumonia has been additional common Intensive care unit patients in Asian and European hospitals. It's the foremost reason behind patient morbidity and mortality. There are several health facility pathogens like norovirus, eubacterium difficile, and Acinetobacter spp. Principally infections are unfold via the hands of health care personnel, who have become contaminated from direct contact with the patient or indirectly by touching contaminated environmental surfaces.

The transmission of above mentioned pathogens takes place through environmental contamination. All three pathogens survive for prolonged periods of time within the environment, and infections are related to frequent surface contamination in hospital rooms and health care employee hands. In some cases, the extent of patient-to-patient transmission has been found to be directly proportional to the extent of environmental contamination. Improved cleaning/disinfection of environmental surfaces and hand hygiene are shown to scale down the spread of all of those pathogens. Significantly, norovirus and Clostridium difficile are comparatively resistant against the foremost common surface disinfectants and arid alcohol-based antiseptics.

Current hand hygiene pointers and proposals for surface cleaning/disinfection ought to be followed in managing outbreaks owing to these rising pathogens. During this study the most focus is on Acinetobacter pathogens, their species, medical specialty and ways that to bring down the contamination of hospital environments.

INTRODUCTION

A considerable proportion of critically sick patients acquire an infection throughout their presence in a medical aid unit (ICU) and also the frequency of those infections varies significantly in several populations and clinical settings [1–3]. The event of social unit-acquired infections is powerfully associated with prolonged ICU keep and is related to worse outcomes as well as inflated morbidity and mortality [4, 5].

During the last 20 years clinicians in numerous countries have witnessed a growing range of critically sick patients who are suffering from infections owing to microorganisms that belong to the Acinetobacter genus, principally strains of the species Acinetobacter baumannii. Acinetobacter are a bunch of non-fermentative gram-negative microorganism that have borderline nutritionary needs and might survive on a spread of surfaces and binary compound environments [3, 6]. With the exception of social unit patients it's been shown to be a reason behind community-acquired tract infections, as well as respiratory disease, in immune competent folks living within the tropics [7].

However, despite these vital associations, they can't be compared with the magnitude of the growing world epidemic of Acinetobacter ICU-acquired infections in critically sick patients. In this article, a study is made on the review of surveillance and different prospective and retrospective studies of ICU-acquired infections to estimate the frequency and antimicrobial resistance patterns of Acinetobacter in critically sick patients in numerous areas of the planet.

There are several pathogens that are capable of extant in hospital reservoirs and that environmental contamination might play a task in health facility acquisition are norovirus, viral hepatitis virus, Acinetobacter spp, genus Pseudomonas aeruginosa, Clostridium difficile, and Candida spp[8].

This study can target the role of surface contamination within the transmission of Acinetobacter spp microorganism. The role of surface contamination in transmission of health care-associated pathogens is a vital issue as a result of transmission is often interrupted by acceptable hand hygiene [9, 10] and cleaning/disinfection of environmental surfaces [11, 12, 13]. For instance, improved floor decontamination has been shown to decrease environmental contamination of pathogens [14] and reduce the probability of patients getting affected by pathogens [15].

ACINETOBACTER SPECIES

Acinetobacter baumannii could be an organic phenomenon aerobic gram-negative eubacteria (similar in look to Haemophilus influenzae on Gram stain) usually isolated from the hospital setting and hospitalized patients. A baumannii could be a water organism and preferentially colonizes aquatic environments. This organism is usually polite from hospitalized patients' humor or metastasis secretions, wounds, and urine. In an exceedingly hospital setting, Acinetobacter usually colonizes irrigating solutions and blood vessel solutions.

Acinetobacter species have low virulence however are capable of inflicting infection in organ transplants and symptom leukopenia. Most Acinetobacter isolates recovered from hospitalized patients, notably those recovered from metastasis secretions and excretion, represent colonization instead of infection. Care should be exercised in determinant whether or not the isolate is owing to colonization or is really inflicting infection.

Acinetobacter infections don't seem to be passing common however, once they occur, typically involve organ systems that have a high fluid content (Eg, tract, CSF, serous membrane fluid, urinary tract). These infections might occur as outbreaks instead of isolated cases of health facility respiratory disease. Infections might complicate continuous mobile serous membrane chemical analysis (CAPD) or cause catheter-associated bacteruria.

The presence of Acinetobacter isolates in metastasis secretions in intubated patients might represent colonisation. Acinetobacter pneumonias occur in outbreaks and are typically related to settled respiratory-support instrumentality or fluids. The 2005 IDSA pointers for hospital-acquired respiratory disease discuss the role of Acinetobacter as a reason behind health facility respiratory disease. Health facility infectious disease might occur in settled neurosurgical patients with external cavity voidance tubes [17, 18].

A baumannii could be a multi resistant aerobic gram-negative bacillus sensitive to comparatively few antibiotics. A baumannii has perpetually been a multidrug-resistant organism inherently proof against multiple antibiotics.

EPIDEMIOLOGY OF ACINETOBACTER

Acinetobacter usually colonizes patients within the medical aid setting. Acinetobacter colonization is especially common in patients who are intubated and in people who have multiple blood vessel lines or observance devices, surgical drains, or inward urinary catheters. Acinetobacter infections are uncommon and occur nearly solely in hospitalized patients.

- **Mortality/Morbidity**

Although Acinetobacter is primarily a beginner within the hospital atmosphere, it often causes infection. Mortality and morbidity ensuing from a baumannii infection relate to the underlying internal organ immune standing of the host instead of the inherent virulence of the organism.

Mortality and morbidity rates in patients who are terribly unwell with multisystem sickness are increased due to their underlying sickness instead of the superimposed infection with Acinetobacter.

Acinetobacter infection has no known racial, sexual and age predilection.

Patients with Acinetobacter infection have signs and symptoms associated with the organ system concerned, i.e., wound infection, episodic outbreaks of health facility respiratory disorder, CAPD-associated rubor, nosocomial meningitis, or catheter-associated bacteruria.

The following is summarized from an article by Go and Cunha [19]:

- Acinetobacter unremarkably colonizes skin, cavum secretions, metabolism secretions, and urine.

- Acinetobacter uncommonly colonizes the epithelial duct and is related to health facility pneumonias (which typically occur as outbreaks), bacteremias, and wound infections.

- Acinetobacter infection isn't related to infectious disease, carditis(native valve infective endocarditis and prosthetic valve endocarditis), peritonitis, tract infections, community-acquired respiratory disorder, and cholangitis.

- **Environmental survival**

Multiple being outbreaks of Acinetobacter are according, most typically in medical aid units [7]. The potential to cause outbreaks is increased by the flexibility of Acinetobacter to survive within the atmosphere on dry surfaces as well as in water for prolonged periods of time (weeks) [20]. In vitro experiments have incontestible that Acinetobacter will survive on multiple surfaces as well as Formica, ceramic, chrome steel, rubber, and vinyl resin. Wendt et al tested ten strains of a baumannii on four surfaces (ceramic, vinyl resin, rubber, and unblemished steel); five hundredth of survival curves showed survival at relevant colony counts of over 102 colony-forming units (CFU) per sample for a minimum of two weeks [21]. Higher ratio promotes survival. Each spasmodic and irruption strains of a baumannii exhibited prolonged survival on dry surfaces (mean survival time, twenty one to thirty one days) [22]. In one irruption, the irruption strain of Acinetobacter was isolated from a bed rail nine days when the infected patient had been discharged [23]. In an exceedingly human challenge study, Acinetobacter survived on fingertips for an hour [24].

- **Role of Acinetobacter in contamination of Hospital atmosphere**

Extensive environmental contamination has been incontestible in varied outbreaks. Colonized sites have enclosed bed rails, side tables, surfaces of ventilators, sinks, suction instrumentality, mattresses, revitalisation instrumentality, curtains, and slings for patient lifting, mops, buckets, door handles, stethoscopes, incubators, and laptop keyboards. The colonization of tract instrumentality and devices has been common. The frequency of environmental contamination in irruption settings has been according by investigators to vary from third to five hundredth [20]. Colonization of the hands of health care staff with Acinetobacter has been demonstrated. As an example, Markogiannakis et al recovered Acinetobacter from twelve of forty two (28.6%) hand cultures [25].

MEASURES FOR MITIGATING CONTAMINATION

Precautions ought to be taken to forestall colonized patients from colonizing different patients, significantly within the intensive care unit. Though Acinetobacter colonization seldom leads to infection, colonization will precede infection. colonization in one patient could end in infection in another patient. For these reasons, each try ought to be created to isolate patients who are colonized with Acinetobacter so as to forestall different patients from changing into colonized.

Common Guidelines

Common measures to regulate Acinetobacter outbreaks have enclosed

1. Improving hand hygiene, use of Contact Precautions for colonized or infected patients,
2. Isolating colonized or infected patients, isolating employees once taking care of colonized or infected patients,
3. Use of Surveillance cultures to spot colonized patients, and unit closure. Investigations have often unconcealed an environmental reservoir that was most typically metabolism instrumentality.
4. Use of hand antiseptics like liquid soap, ethanol, povidone-iodine and chlorhexidine and their combinations are effective in removing Acinetobacter from lightly contaminated hands [26]. However, when fingertips are heavily contaminated more concentrated ethanol and povidone-iodine are more effective.
5. Improved cleanup frequency and efforts to wash all surfaces are vital still as sterilization/disinfection of doubtless contaminated respiratory/water sources/devices like humidifiers, pressure transducers, spirometers, temperature probes, and ventilators.
6. Acinetobacter has been shown to be vulnerable to phenols, quaternary ammonium ion compounds, a 0.5% accelerated peroxide product, and ultraviolet radiation [20]. For this reason, standard Environmental Protection Agency-approved hospital disinfectants are counseled for surface medical care throughout Acinetobacter outbreaks. As always, surface disinfectants have to be compelled to have contact with all contaminated surfaces, and that they ought to be applied within the applicable concentrations for the right time.

CONCLUSION

The Scientific proof from earlier studies proves that atmosphere contamination plays a vital role within the transmission of pathogens like norovirus, C difficile, and Acinetobacter. Thus controlling the environmental infection is a vital task. The Environmental infection can be controlled in hospitals and other health care facilities by practicing above mentioned guidelines. It includes sterilization, use of disinfectants and maintaining correct hygiene etc. For all 3 pathogens, enhanced cleaning and disinfection of all room surfaces are highly recommended for

managing outbreaks. Or else, the employment of no touch medical care ways like ultraviolet radiation and vaporized H_2O_2 is also used. During this means by following the on top of pointers, a health care-associated irruption or outbreak may be controlled.

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