Analysis of Isolation Precautions in a Tertiary Training and Research Hospital

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ABSTRACT

Objectives: Isolation precautions are used to take control of pathogen transmission and reduce hospital-acquired infections. The aim of our research is to evaluate all patients for whom isolation is recommended, to determine isolation types, growing microorganisms and isolation compliance.

Methods: All patients isolated within a calendar year were analyzed based on infection control committee records. Of the isolation patients, 14.6% (201/1379) were in the pediatric infection clinic, 14.1% (194/1379) in the pediatric clinics, 11.2% (155/1379) in the general intensive care unit, 8.3% (115/1379) was followed in the urology clinic.

Results: In 2018; 83,750 patients were hospitalized and followed up in our hospital. Isolation was recommended for 1379 (1.6%) of the hospitalized patients. Of the isolation recommended patients, 14.6% (201/1379) were in the pediatric infection clinic, 14.1% (194/1379) in the pediatric clinics, 11.2% (155/1379) in the general intensive care unit, 8.3% (115/1379) was followed in the urology clinic.

Conclusion: Isolation precautions are very important in protecting both patients and healthcare workers from transmission of infections. It should be aimed to determine the isolation periods in accordance with the criteria determined in the international guidelines and discontinuing the isolation measures as soon as possible when the indication is terminated.

Keywords: Patient isolation, infection control, transmission

Healthcare-associated infections (HAIs) are defined as infections acquired in the hospital settings that are not present at hospital admission [1]. HAIs usually develop 48-72 hours after the patient's hospitalization and within 10 days after discharge. It is of great importance to implementing an effective infection control program has great importance in order to reduce morbidity, mortality and increasing cost associated with hospital infections. Studies on infection control began in the early 1970s with the appointment of the first infection control nurse in England [2]. In our country, the Infection Control Committee was established at Hacettepe University in 1984 and at Istanbul University Istanbul Faculty of Medicine in 1985. In 2005, the Infection

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Control Committee became obligatory in hospitals with the "Regulation on the Amendment of the Operating Regulation of Inpatient Treatment Institutions". After the specified date, the Infection Control Committee was established in our hospital and continues to work today. Isolation precautions are used to take control of pathogen transmission and reduce HAIs. The purpose of isolation is to prevent transmission from patient to patient or from patient to healthcare personnel. The aim of our research is to evaluate all patients for whom isolation is recommended, to determine isolation types, growing microorganisms and isolation compliance.

METHODS

All patients who were recommended to be isolated in Health Sciences University Bursa Yüksek İhtisas Training and Research Hospital between January 01, 2018 and December 31, 2018 were examined retrospectively from the infection control committee reports and hospital automation system records. A sample selection method was not used because analysis of all patients was planned. Data analysis was accomplished by IBM SPSS 21.0 statistical program. Descriptive statistics were specified as frequencies and percentages for qualitative data. Chi-square test was used to analyse whether there was a relationship between categorical variables. $P < 0.05$ was considered statistically significant.

RESULTS

In 2018; 83,750 patients were hospitalized and followed up in our hospital. Isolation was recommended for 1379 (1.6%) of the hospitalized patients (Table 1). Of these patients, 601 (43.6%) were male, 788 (56.4%) were female, and the age of the patients ranged from 0 to 104 (42.2 ± 32.2 SD). Of the isolation recommended patients, 14.6% (201/1379) were in the pediatric infection clinic, 14.1% (194/1379) in the pediatric clinics, 11.2% (155/1379) in the general intensive care unit, 8.3% (115/1379) was followed in the urology clinic (Table 2). In terms of isolation methods, contact isolation was recommended for 1041 (75.4%) patients, close contact isolation was recommended for 220 (16.6%) patients, respiratory isolation was recommended for 63 (4.6%) patients, and droplet isolation was recommended for 55 (4.0%) patients. When we look at the microorganisms that are the cause of isolation, extended-spectrum beta-lactamase (ESBL) positive *Escherichia coli* (25.3%), *Klebsiella pneumoniae* (16.8%) and Rotavirus (16.2%) were in the front row (Table 3). When evaluated in terms of isolation compliance, hospital-wide compliance was found to be 96.4%. Compliance with isolation measures was statistically significantly lower in the urology clinic. ($p = 0.001$).

DISCUSSION

Isolation precautions are used to prevent the transmission of microorganisms in healthcare settings to other patients and from patient to healthcare staff and visitors. There are three categories of isolations: contact Precautions, droplet Precautions, and airborne Precautions. In an epidemic study conducted by Jernigan *et al*., it was observed that contact isolation reduces the spread of MRSA by 16 times [3]. How-

Table1. Evaluation of Patients Recommended for Isolation

Number of Inpatients (n)	83.750
Number of Patients in Isolation (%)	1379 (1.6)
Gender M/F (%)	601/788 (43.6/56.4)
Age Mean ± SD (min-max)	42.2 ± 32.2 (0-104)
Insulation Precautions	n (%)
Contact isolation	1261 (92.4)
Respiratory isolation	63 (4.6)
Droplet isolation	55 (4.0)
Compliance to Isolation Precautions	n (%)
Yes	1330 (96.4)
No	49 (3.6)

Table 2. Evaluation of Patients Recommended for Isolation According to Clinics

Klinik	n (%)
Pediatric Infectious Diseases	201 (14.6)
General Intensive Care Unit	199 (14.4)
Child Health and Diseases	194 (14.1)
Urology	115 (8.3)
Internal Medicine	108 (7.8)
Cardiovascular Surgery	74 (5.4)
Palliative	55 (4.0)
Neurology	42 (3.0)
Chest Diseases	42 (3.0)
Pediatric Intensive Care Unit	37 (2.7)
Other Clinics	312 (22.7)

ever, when the patient is isolated; there are problems especially in transfer of patients from intensive care units to clinics, patients waiting for hospitalization in emergency services can not be admitted to the clinics, the hospital bed occupancy rate decreases and this creates a vicious circle [3]. In a study conducted by Morgan *et al*., in a tertiary hospital, when the transfer of a patient colonized with a resistant microorganism was compared with a normal patient transfer; it was concluded that it caused a prolonged waiting period; as 10.9 days and 4.3 days, respectively [4]. Isolation of patients also increases the cost of hospitalization. To manage this condition, it is recommended to place patients colonized and/or infected with the same microorganism in the same room (cohorting patients with the same infection). In addition, there may be an overlooked cost when the patient is isolated, the risk of a decrease in the quality of care of the patient and the occurrence of preventable side effects during the isolation period increases [5-7]. It is obvious that isolation precautions is important to protect other patients from transmission of healthcare associated infections. Patient satisfaction is a measure of the extent to which a patient is content with the health care they received from their health care provider. Patient satisfaction is one of the most important factors to determine the success of a health care facility. It has been shown that isolation precautions significantly reduces the patient's satisfaction with the institution. Patients think that they receive less attention as healthcare professionals enter less rooms, communicate less and have less physical contact against patients who are

Tablo 3. Microorganisms Detected in Patients Recommended for Isolation

Microorganism	n (%)
E. coli	349 (25.3)
Klebsiella pneumoniae	231 (16.8)
Rotavirus	223 (16.2)
Acinetobacter baumannii	203 (14.7)
Pseudomonas aeruginosa	102 (7.4)
Mycobacterium tuberculosis	50 (3.6)
Stafilococcus aureus	45 (3.3)
Adenovirus	38 (2.8)
Enterobacter cloacae	29 (1.8)
Vancomycin resistant enterococci	24 (1.7)
Other	85 (6.1)

isolated. It has been shown that the rate of depression and delirium increases in isolated patients [8-10].

The microorganisms isolated at the forefront in our study were Enterobacteriaceae spp, Rotavirus, *Acinetobacter baumannii*. Similar microorganisms were found in the examinations conducted in Poland between 2010 and 2012. It was concluded that the most prevalent microorganisms in 2012 were Enterobacteriaceae ESBL+, Rotavirus and *Acinetobacter baumanii* in this study [11]. While *C.difficile* was at the forefront in this study, it was quite in the background in our study. The difficulties in accessing screening tests for *C.difficile* infections in our hospital may be contributing to this result.

When the clinics with isolation precautions were evaluated, pediatric clinics and intensive care units were found in the first two lines. Similar clinics have been identified in the literature [11]. When the clinics were evaluated, non-compliance to the isolation precautions in the urology clinic was in the first place with 33%, and this non-compliance was statistically significant (p = 0.001). There is no data in the literature showing that isolation precautions are not followed especially in the urology clinic. Since it is a cross-sectional study, such data was obtained during the analysis period. During the study, no outbreaks occurred in the urology clinic or in other clinics. Estrada *et al*., found that non-compliance to isolation procedures was not due to a deficit of materials, but to individual behaviours [12].

CONCLUSION

In conclusion; Isolation precautions are very important in protecting both patients and healthcare workers from transmission of infections. It should be taken into account that both the physical care and mental state of the isolated patient may be adversely affected. It should be aimed to determine the isolation periods in accordance with the criteria determined in the international guidelines and discontinuing the isolation measures as soon as possible when the indication is terminated.

Limitations of the Study

Since our study was a retrospective, cross-sectional study, the number of isolations and their clinics were evaluated, cost analysis, delayed transfers between services were not analyzed.

Ethical Approval

The protocol of the study was approved by the Medical Ethics Committee of Bursa Yuksek Ihtisas Training and Research Hospital, Bursa, Turkey. (Decision number: 2011-KAEK-25 2019/08-07, date: August 21, 2019).

Authors' Contribution

Authors' Contribution Study Conception: AA,; Study Design: AA, CD, MOA, AG,; Supervision: AA,; Materials: CD, MOA, AG,; Data Collection and/ or Processing: AK, ECG,; Statistical Analysis and/ or Data Interpretation: AA, CD, AG; Literature Review: MOA, AG; Manuscript Preparation: AG, MOA and Critical Review: AA, CD, AG.

Conflict of interest

No potential conflicts of interest relevant to this article were reported.

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