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Impact of Patient Separation on Length of Hospitalization

A. Study Purpose and Rationale

In a large hospital such as the 700+ bed Columbia Presbyterian where the medicine inpatient wards span three city blocks and five floors, the geographic accessibility of patients can be a challenge for physicians. Although tertiary care centers have many advantages, patients may suffer an unintended disadvantage if physically separated from a physician by a large distance.

While there is not a substantial literature on the impact of distances between patients, there are several studies that suggest placing a patient in contact isolation precautions based on known colonization status with particular organisms such as MRSA or VRE may negatively affect patient care[1-3]. The hypothesis is that the inconvenience of gowning and gloving leads to an isolated patient receiving less attention from the medical team. While such measures are recommended by the CDC for infection control[4], isolated patients may have a decreased number of physician visits, increased number of falls, increased length of hospitalization and may have worse overall diagnosis specific outcomes[3]. But it is important to acknowledge that patients colonized with antibiotic resistant organisms may inherently have worse outcomes unrelated to isolation - due to overrepresentation of comorbid illness and increased prior contact with healthcare[2]. In addition, length of hospitalization may be influenced by difficulty discharging colonized patients if they are going to nursing homes or skilled nursing facilities since there is continued recommendation by CDC to isolate these patients if possible given excess mortality associated with MRSA infections[4]. Therefore, it is difficult to separate the potential negative effect of isolation from different baseline patient characteristics.

In a large hospital, patients placed on contact isolation are not the only ones who are "isolated" from the medical team. On the general medicine teaching service at CUMC, the majority of patients are placed in one of two adjacent nursing units. However, due to bed availability, some are placed on different units on different floors. For the purposes of this study, patients placed on different floors will be categorized as "isolated" – while not in contact isolation precautions, they are regularly housed patients on a different floor than most of the other patients cared for by a particular team. The exact percentage is variable, but approximately 20% of general medicine patients at any one given time are isolated.

The hypothesis is that level of attention these few patients receive from the medical team suffers leading to delays in administrating appropriate care, and therefore the length of hospitalization will increase. The value if true is to demonstrate a potentially correctable systems issue leading to delays in patient disposition which has both medical and financial implications.

B. Study Design and Statistical Analysis

This is a retrospective cohort study of patients over the last year on General Medicine 1. Patients on the main floor will be compared to patients with identical admission diagnoses on another floor to determine if this group has an increased length of stay. The secondary outcome is patient satisfaction based on patient complaints / attempts to leave AMA. The patients will be matched by diagnosis, disease severity and if possible time of year to patients. Disease severity will be determined by APACHE II score[6]. Although the score is traditionally used to predict ICU mortality, its components including metrics of hemodynamics, organ failure, oxygen requirement and basic electrolyte values are applicable to ward medicine and it has widespread use[7]. There are disease-specific mortality predictor scores (ex. PORT score for pneumonia[8] and Ranson's criteria for pancreatitis[9]), however use of these would limit the range of diagnoses in the study. Matching by time of year – hopefully within the same month – will attempt to account for different hospital personnel who rotate through the service. In addition, efforts will be made to match by location within the nursing station (nursing units on different floors are organized similarly).

The majority of patients, ~80%, are on one of two adjacent nursing units. The remaining 20% are on different floors. The total average length of stay is ~8 days on General Medicine 1. With approximately 6 patients at any one time on different floors and the average stay of 8 days (standard deviation 3), there are about 600 patients on different floors during a two year period. These patients will be matched in a 1:2 ratio with their counterparts on the regular floor given the availability of regular floor patients to improve the power of the study. If a patient is in contact isolation, they will be matched to a regular floor patient also in contact isolation. Although the ratio of total patients is 1:4, given the requirement to match by diagnosis and disease severity, the protocol will aim for 1:2. Patients who stay at the hospital longer than 15 days will be excluded from the study because this length of inpatient hospitalization may reflect serious medical illness, but may also be due to difficulties arranging discharge. This is not affected by the exposure. Private patients and patients on floors whose nurses do not care for medicine patients are also excluded (to limit confounding by different nurses).

Although there are no prior studies of this sort which we are aware of, the estimate based on our experience is that average length of stay will increase ~ 5% corresponding to ~.5 days (given avg length of hospitalization of 8 days). Using an unpaired t-test, with $p = 0.05$ and power 80% (std deviation 3), this study will be powered to detect a difference of 0.42 days in length of hospitalization (600 patients on different floors, 1200 on "home" floor). This will be adequate power for the estimated effect.

C. Study Procedure

Patients' medical record numbers from the last year in general medicine 1 can be obtained from the hospital admitting coordinator. Then a medical reviewer will look at the chart from the visit, remove all identifying information, and abstract the admission note / physician

progress notes / discharge summary / relevant laboratory data (to calculate the APACHE II score) onto a standard summary sheet. Co-morbid diagnoses will be recorded to be reviewed later when determining the similarity between groups. This will first be done for patients on different floors ("exposed patients"), then patients of other patient's admitted that month with the same diagnosis on the regular floor. The location of the patient will be noted and subsequent medical reviewers who are blinded to the location of the patients will review the data and calculate APACHE II scores and match the patients. For the APACHE II score, if the arterial pH is unavailable it is assumed to be normal. The goal will be to match the score within 3 points.

Once matched (1:2), the average length of stay for each group will be calculated. In addition, the chart will be reviewed for evidence of dissatisfaction: either formal complaints via a patient representative, leaving AMA or informal documented complaints.

D. Study Drugs : not applicable

E. Medical Device: not applicable

F. Study Questionnaire: not applicable

G. Study Subjects:

All ward patients over the last calendar year on the gen med 1 service are eligible. The exclusion criteria are if the patient has a private attending, is on a floor whose nurses don't typically care for medicine patients and LOH > 15 days. Often times with longer length of hospitalization discharge planning becomes as relevant as medical illness. Presumably this is not affected by hospital location. First, patients on different floors will be selected and subsequently matched patients on the regular hospital floor will be picked based on criteria described above.

H. Recruitment of Subjects

Subjects will not be specifically recruited, but charts will be reviewed retrospectively as described above.

I. Confidentiality of Study Data

The initial medical reviewers who have access to identifying patient information will discard it as charts are abstracted. Subsequent blinded medical reviewers will not have access to such information.

J. Potential Conflict of Interest: No potential conflicts of interest

K. Location of the Study

The study will take place at Milstein Hospital at Columbia Presbyterian Medical Center.

L. Potential Risks

This is a retrospective chart review, so there are no identifiable risks to the study subjects.

M. Potential Benefits

This a retrospective chart review, so study subjects will not have a benefit.

N. Alternative Therapies: not applicable

O. Compensation of Subjects: none

P. Costs to Subjects: none

Q. Minors as Research Subjects

The study subjects are from the general medicine service who are all over 21.

R. Radiation or Radioactive Substances: not applicable

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