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Short Communication

Factors influencing resident performance of invasive bedside procedures

Cynthia Kay[1], Aniko Szabo[2], Jeffrey L Jackson[1]

[1]General Internal Medicine, Medicine, Medical College of Wisconsin & Zablocki VA, Milwaukee, USA
[2]Institute for Health and Society, Medical College of Wisconsin, Milwaukee, Wisconsin, USA

Address for correspondence:
Cynthia Kay, General Internal Medicine, Medicine, Medical College of Wisconsin & Zablocki VA, Milwaukee, USA

ckay@mcw.edu

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ABSTRACT

Objective: We explore United States internal medicine residents' decision making regarding the performance and referral of invasive bedside procedures. **Methods:** We conducted a qualitative study comprised of a 5-question resident survey and resident focus groups at our tertiary academic medical center. **Results:** Residents rated time, available supervision, and their training as being most important when deciding whether to perform or refer procedures. Those who performed their own procedures rated more factors as being important in their decision compared to those who referred ($p < 0.001$). Six themes including time, supervision, opportunity, patient characteristics, logistics, and resident expectations emerged from the focus groups as influencing referrals. **Conclusions:** Residents refer the majority of procedures they encounter. A number of barriers to resident performance of procedures emerged. Further research is necessary to address these identified barriers and determine if and how referral status affect resident education, hospitalization costs, and overall patient care.

KEY WORDS: Internal medicine residents, bedside procedures, qualitative study

INTRODUCTION

Before 2007, the American Board of Internal Medicine (ABIM) required documentation of competency and the actual performance of seven required procedures before candidates were eligible to take the ABIM certification exam.[1] However, recognizing that the nature of internal medicine practice had evolved with internists performing fewer procedures,[2] in 2007, the ABIM retracted the requirement for performing paracentesis, thoracentesis and lumbar puncture. Instead, they chose to focus on residents' competence in recognizing these procedures' indications, contraindications and complications.[3]

Despite these requirement changes, residents continue to encounter patients needing procedures. While prior studies have explored factors that may be associated with residents' comfort or lack thereof with procedures, no study has examined the factors that impact their decision making process regarding performing or referring procedures, such as attendings' presence, patient co-morbidities and time.[4,5] In addition, no study has yet to quantify the amount of procedures residents actually encounter with the number performed. Our study's purposes are to explore residents' decision making of invasive bedside procedures and objectively review residents' procedure performance patterns.

METHODS

Setting and Participants

Study participants were internal medicine residents at the Medical College of Wisconsin rotating at Froedtert Hospital, a tertiary academic medical center in Milwaukee, Wisconsin. A total of 106 surveys were completed. Surveys were anonymous and not tied to unique identifiers. Residents could have been invited to complete the survey multiple times throughout the study period. Ten residents took part in the focus groups.

Data Collection

Beginning February 2013 and ending February 2014, all inpatient thoracentesis, paracentesis and lumbar punctures were identified daily through the hospital's electronic medical record. Only procedures done for hospitalized adults admitted to a non-intensive care medical service were included. We excluded outpatient procedures and those done in the Emergency Department.

For each identified procedure done for a teaching service patient, the corresponding residents were invited to take a survey about the factors that influenced their decision to refer or perform the procedure themselves. The survey was sent out as soon as the procedure was confirmed, which ranged from hours to up to two days.

The survey was created after review of resident procedure literature and associated surveys,[4-7] and discussion with key stakeholders at our institution (hospitalists, internal medicine clinic faculty, and residents). The study asked residents to rate on a five point Likert scale (1 being the lowest and 5 highest) how much six factors (time, patient comorbidities, supervision, attending's comfort, personal training, and personal comfort) influenced their decision to either refer or perform the procedure. It was piloted for clarity and understanding with graduating residents. Surveys were voluntary. They were available online with the link emailed to residents and in hard copy.

Resident Focus Groups

We conducted focus groups to explore residents' attitudes and experiences with procedures. Focus groups were conducted three times from November 2013 to January 2014, with the intern session taking place six months into their internship year. Sessions were exclusive to each post-graduate year to avoid peer pressure. Residents on an elective were invited to participate. They signed an informed consent and received lunch for their time. All sessions were moderated by the Principal Investigator (CK). The moderator asked general questions regarding the participants' experience with the three procedures of interest and helped guide discussion on various aspects of procedures.

Analysis

The survey's five point Likert scale was reduced into a binomial outcome, combining "Agree" and "Strongly Agree" into "Influential" and "Neutral," "Disagree" and "Strongly Disagree" into "Low." We generated descriptive statistics of survey responses. Two sided t-test was calculated to compare the number of "Influential" factors between referral status.

Focus groups were recorded and transcribed verbatim. Qualitative analysis was done using a grounded theory approach. Two coders (CK, JJ) independently reviewed the transcripts, created codes and identified themes. The coders met after each transcript, discussed the codes and themes and reached consensus. This project was approved by the MCW Institutional Review Board. Study data were collected and managed using REDCap (Research Electronic Data Capture) tools hosted at MCW.[8] All data analysis was done using STATA 12.1 (StataCorp, College Station, TX).

RESULTS

In one year, a total of 399 procedures were performed. The majority was thoracentesis (n= 168, 42%) followed by paracentesis (n=164, 41%) and lumbar puncture (n=67, 17%). Resident-run teams cared for most of the patients requiring procedures (n=288, 72%). Residents performed 15% of procedures (n=59). Referral frequency for each type of procedure was similar: lumbar punctures 84% (n=56), thoracentesis 87% (n=146), and paracentesis 81% (n=133).

A total of 378 survey invitations were sent, with a response rate of 28% (n=106). Respondents were evenly split between interns and residents (PGY1=54, 51%), with an inverse relationship between post graduate year and response rate (PGY2=35, 33%; PGY3=16, 15%, PGY4=1, 1%). Influential factors included time (n=65, 61%), training (n=64, 60%) and availability of adequate supervision (n=57, 54%). Less important factors included patient comorbidities (n=40, 38%), attending comfort with procedure (n=39, 37%) and resident procedure comfort (n=43, 41%).

T-test between average number of "Influential" ratings by referral status was significantly different. Residents who performed their own procedures rated on average four factors as being important in their decision, while those who referred rated an average of just two ($p < 0.001$).

Focus groups

Ten residents participated in the three focus groups (n=4 for PGY1, n=3 for PGY2 and PGY3). Residents across post graduate years shared similar views on procedures. We identified six themes that affected the decision-making process: time, supervision, experience, patient characteristics, logistics and resident expectations. These themes and sample quotations are presented in Table 1.

DISCUSSION

In our pilot study, we found that residents refer the majority of procedures they encounter, weigh more factors when performing procedures than when referring, and identify a number of barriers to doing procedures.

The referral pattern in our study is in line with a previous work that found radiology performs the majority of procedures.[9] Survey results suggested patient characteristics had less influence on the referral process, which were similar to a study by Barsuk et al.[10] That study also found that having a dedicated hepatology service, providing ample opportunity, increased the proportion of paracentesis performed at bedside.[10] Our focus groups revealed that residents felt responsible for procedures but lacked confidence due to inadequate opportunities and supervision.

Our results raise questions regarding residency procedure training. Patient outcomes, the rising cost of healthcare, and the growth of hospital medicine are all concerns. Limited research on the outcomes and costs of referred and non-referred procedures suggests referral may not be the better decision.[10] Hospital medicine is the fastest growing medicine specialty[11-13] and has become a popular career choice for residents. It has a set of core competencies incorporating knowledge, skills, and attitude for nine procedures, which include the three procedures in our study.[14-17] While hospitalists' procedure responsibilities are dependent on their hospital of employment, there are a few situations where procedure performance may be of particular importance.

Table 1. Resident Focus Group Themes and Example Quotes

Theme	Example Quotes
Time	• "There are admissions to be seen, discharges to be done, conferences to attend, it may be very difficult to set aside a block of time for a procedure that may be relatively easy to do...." • "Trying to get that within duty hour restrictions is almost next to impossible."
Supervision	• "I don't feel confident doing any of these procedures unsupervised...." • "If the attending is comfortable being there, we're okay doing them."
Experience/Opportunity	• "You'd have to get pretty lucky to have that circumstance even present itself." • "My last ward month, I did not have a single opportunity to do any."
Patient Characteristics	• "If you have someone that's cirrhotic and they have a very high MELD score...less likely to do it yourself blindly and just send to radiology..." • "Your tiny, little, frail arthritic patients you're doing an [lumbar puncture] on, you might be more inclined to send them to radiology because you know it's going to be hard to get that stick."
Logistics	• "The fact that there's not an ultrasound machine that is dedicated for a medicine person to do a procedure…it adds a lot of complexity." • "If you're going to do it yourself...you're going to need to do things like...find the ultrasound machine...get that to the patient's room, put in [orders] for the stuff...." • "We're not really set up to do it. It's a lot harder to do than it could be. There's a lot of systematic barriers to it."
Resident/Resident Expectations	• "Sometimes…it's pretty easy to have that knee-jerk reflex of putting the order in." • "I think procedures have to be considered a part of the care we're giving the patient. It's not just diagnosing or labs and imaging. This is definitely one aspect of patient care that can't be overlooked." • "I'm ... worried about being a senior resident and expected to be able to do these procedures...." • "My expectation of myself is that I have to be comfortable with any of those procedures. They're my patients and they'll be my responsibility."

One specific setting is that in community or rural sites, where past research has shown internists are more likely to perform procedures compared to their urban counterparts.[18]

There are a number of limitations to this study. First, it was conducted at a single, urban, academic medical center. Whether findings can be generalized to other academic centers or types of hospitals is unknown. Selection bias is also a possibility. Residents with an interest in procedures may have been more likely to take part in this study. In addition, the low survey response rate and focus group participation demonstrate the challenges with conducting research involving medical residents.

We confirmed that residents refer the majority of procedures they encounter and explored what factors influence their decision to refer procedures. Important questions, such as the impact of referral on patient outcomes and resident education remain unanswered. Our results implore further research in this area.

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DISCLAIMER

The authors declare they have no conflict of interest.

PRIOR PRESENTATIONS

This manuscript has been presented at the national SGIM meeting in San Diego, California in May 2014.

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