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ORIGINAL RESEARCH

Prospective Comparison of Curbside Versus Formal Consultations

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BACKGROUND: Curbside consultations are commonly requested during the care of hospitalized patients, but physicians perceive that the recommendations provided may be based on inaccurate or incomplete information.

OBJECTIVE: To compare the accuracy and completeness of the information received from providers requesting a curbside consultation of hospitalists with that obtained in a formal consultation on the same patients, and to examine whether the recommendations offered in the 2 consultations differed.

DESIGN: Prospective cohort.

SETTING: University-affiliated, urban safety net hospital.

MAIN OUTCOME MEASURES: Proportion of curbside consultations with inaccurate or incomplete information; frequency with which recommendations in the formal consultation differed from those in the curbside consultation.

RESULTS: Curbside consultations were requested for 50 patients, 47 of which were also evaluated in a formal consultation performed on the same day by a hospitalist other than the one performing the curbside consultation. Based on information collected in the formal consultation, information was either inaccurate or incomplete in 24/47 (51%) of the curbside consultations. Management advice after formal consultation differed from that given in the curbside consultation for 28/47 patients (60%). When inaccurate or incomplete information was received, the advice provided in the formal versus the curbside consultation differed in 22/24 patients (92%, $P < 0.0001$).

CONCLUSIONS: Information presented during inpatient curbside consultations of hospitalists is often inaccurate or incomplete, and this often results in inaccurate management advice. *Journal of Hospital Medicine* 2013;8:31–35. © 2012 Society of Hospital Medicine

A curbside consultation is an informal process whereby a consultant is asked to provide information or advice about a patient's care without doing a formal assessment of the patient.[1–4] Curbside consultations are common in the practice of medicine[2,3,5] and are frequently requested by physicians caring for hospitalized patients. Several surveys have documented the quantity of curbside consultations requested of various subspecialties, the types of questions asked, the time it takes to respond, and physicians' perceptions about the quality of the information exchanged.[1–11] While curbside consultations have a number of advantages, physicians' perceptions are that the information conveyed may be inaccurate or incomplete and that the advice offered may be erroneous.[1–3,5,10,12,13]

Cartmill and White[14] performed a random audit of 10% of the telephone referrals they received for neurosurgical consultation over a 1-year period and noted discrepancies between the Glascow Coma Scores reported during the telephone referrals and those noted in the medical records, but the frequency of these discrepancies was not reported. To our knowledge, no studies have compared the quality of the information provided in curbside consultations with that obtained in formal consultations that included direct face-to-face patient evaluations and primary data collection, and whether the advice provided in curbside and formal consultations on the same patient differed.

We performed a prospective cohort study to compare the information received by hospitalists during curbside consultations on hospitalized patients, with that obtained from formal consultations done the same day on the same patients, by different hospitalists who were unaware of any details regarding the curbside consultation. We also compared the advice provided by the 2 hospitalists following their curbside and formal consultations. Our hypotheses were that the information received during curbside consultations was frequently inaccurate or incomplete, that the recommendations made after the formal consultation would frequently differ from those made in the curbside consultation, and that these differences would have important implications on patient care.

METHODS

This was a quality improvement study conducted at Denver Health, a 500-bed university-affiliated urban

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safety net hospital from January 10, 2011 to January 9, 2012. The study design was a prospective cohort that included all curbside consultations on hospitalized patients received between 7 AM and 3 PM, on intermittently selected weekdays, by the Internal Medicine Consultation Service that was staffed by 18 hospitalists. Data were collected intermittently based upon hospitalist availability and was done to limit potential alterations in the consulting practices of the providers requesting consultations.

Consultations were defined as being curbside when the consulting provider asked for advice, suggestions, or opinions about a patient's care but did not ask the hospitalist to see the patient.[1–5,15] Consultations pertaining to administrative issues (eg, whether a patient should be admitted to an intensive care bed as opposed to an acute care floor bed) or on patients who were already being followed by a hospitalist were excluded.

The hospitalist receiving the curbside consultation was allowed to ask questions as they normally would, but could not verify the accuracy of the information received (eg, could not review any portion of the patient's medical record, such as notes or lab data). A standardized data collection sheet was used to record the service and level of training of the requesting provider, the medical issue(s) of concern, all clinical data offered by the provider, the number of questions asked by the hospitalist of the provider, and whether, on the basis of the information provided, the hospitalist felt that the question(s) being asked was (were) of sufficient complexity that a formal consultation should occur. The hospitalist then offered advice based upon the information given during the curbside consultation.

After completing the curbside consultation, the hospitalist requested verbal permission from the requesting provider to perform a formal consultation. If the request was approved, the hospitalist performing the curbside consultation contacted a different hospitalist who performed the formal consultation within the next few hours. The only information given to the second hospitalist was the patient's identifiers and the clinical question(s) being asked. The formal consultation included a complete face-to-face history and physical examination, a review of the patient's medical record, documentation of the provider's findings, and recommendations for care.

Upon completion of the formal consultation, the hospitalists who performed the curbside and the formal consultations met to review the advice each gave to the requesting provider and the information on which this advice was based. The 2 hospitalists jointly determined the following: (a) whether the information received during the curbside consultation was correct and complete, (b) whether the advice provided in the formal consultation differed from that provided in the curbside consultation, (c) whether the advice provided in the formal consultation dealt with issues *other* than one(s) leading to the curbside consultation, (d) whether differences in the recommendations given in the curbside versus the formal consultation changed patient management in a meaningful way, and (e) whether the curbside consultation alone was felt to be sufficient.

Information obtained by the hospitalist performing the formal consultation that was different from, or not included in, the information recorded during the curbside consultation was considered to be incorrect or incomplete, respectively. A change in management was defined as an alteration in the direction or type of care that the patient would have received as a result of the advice being given. A pulmonary and critical care physician, with >35 years of experience in inpatient medicine, reviewed the information provided in the curbside and formal consultations, and independently assessed whether the curbside consultation alone would have been sufficient and whether the formal consultation changed management.

Curbside consultations were neither solicited nor discouraged during the course of the study. The provider requesting the curbside consultation was not informed or debriefed about the study in an attempt to avoid affecting future consultation practices from that provider or service.

Associations were sought between the frequency of inaccurate or incomplete data and the requesting service and provider, the consultative category and medical issue, the number of questions asked by the hospitalist during the curbside consultation, and whether the hospitalist doing the curbside consultation thought that formal consultation was needed. A chi-square test was used to analyze all associations. A P value of <0.05 was considered significant. All analyses were performed using SAS Enterprise Guide 4.3 (SAS Institute, Inc, Cary, NC) software. The study was approved by the Colorado Multiple Institutional Review Board.

RESULTS

Fifty curbside consultations were requested on a total of 215 study days. The requesting service declined formal consultation in 3 instances, leaving 47 curbside consultations that had a formal consultation. Curbside consultations came from a variety of services and providers, and addressed a variety of issues and concerns (Table 1).

The hospitalists asked 0 to 2 questions during 8/47 (17%) of the curbside consultations, 3 to 5 questions during 26/47 (55%) consultations, and more than 5 questions during 13/47 (28%). Based on the information received during the curbside consultations, the hospitalists thought that the curbside consultations were insufficient for 18/47 (38%) of patients. In all instances, the opinions of the 2 hospitalists concurred with respect to this conclusion, and the independent reviewer agreed with this assessment in 17 of these 18 (94%).

TABLE 1. Characteristics of Curbside Consultations (N = 47)

	Curbside Consultations, N (%) 47 (100)
Requesting service	
Psychiatry	21 (45)
Emergency Department	9 (19)
Obstetrics/Gynecology	5 (11)
Neurology	4 (8)
Other (Orthopedics, Anesthesia, General Surgery, Neurosurgery, and Interventional Radiology)	8 (17)
Requesting provider	
Resident	25 (53)
Intern	8 (17)
Attending	9 (19)
Other	5 (11)
Consultative issue*	
Diagnosis	10 (21)
Treatment	29 (62)
Evaluation	20 (43)
Discharge	13 (28)
Lab interpretation	4 (9)
Medical concern*	
Cardiac	27 (57)
Endocrine	17 (36)
Infectious disease	9 (19)
Pulmonary	8 (17)
Gastroenterology	6 (13)
Fluid and electrolyte	6 (13)
Others	23 (49)

*Consultations could be listed in more than one category; accordingly, the totals exceed 100%.

The advice rendered in the formal consultations differed from that provided in 26/47 (55%) of the curbside consultations, and the formal consultation was thought to have changed management for 28/47 (60%) of patients (Table 2). The independent reviewer thought that the advice provided in the formal consultations changed management in 29/47 (62%) of the cases, and in 24/28 cases (86%) where the hospitalist felt that the formal consult changed management.

Information was felt to be inaccurate or incomplete in 24/47 (51%) of the curbside consultations (13/47 inaccurate, 16/47 incomplete, 5/47 both inaccurate and incomplete), and when inaccurate or incomplete information was obtained, the advice given in the formal consultations more commonly differed from that provided in the curbside consultation (19/24, 79% vs 7/23, 30%; $P < 0.001$), and was more commonly felt to change management (22/24, 92% vs 6/23, 26%; $P < 0.0001$) (Table 2). No association was found between whether the curbside consultation contained complete or accurate information and the consulting service from which the curbside originated, the consulting provider, the consultative aspect(s) or medical issue(s) addressed, the number of questions asked by the hospitalist during the curbside consultation, nor whether the hospitalists felt that a formal consultation was needed.

TABLE 2. Curbside Consultation Assessment

	Curbside Consultations, N (%)		
	Total	Accurate and Complete	Inaccurate or Incomplete
	47 (100)	23 (49)	24 (51)
Advice in formal consultation differed from advice in curbside consultation	26 (55)	7 (30)	19 (79)*
Formal consultation changed management	28 (60)	6 (26)	22 (92)†
Minor change	18 (64)	6 (100)	12 (55)
Major change	10 (36)	0 (0)	10 (45)
Curbside consultation insufficient	18 (38)	2 (9)	16 (67)†

*$P < 0.001$, †$P < 0.0001$.

DISCUSSION

The important findings of this study are that (a) the recommendations made by hospitalists in curbside versus formal consultations on the same patient frequently differ, (b) these differences frequently result in changes in clinical management, (c) the information presented in curbside consultations by providers is frequently inaccurate or incomplete, regardless of the providers specialty or seniority, (d) when inaccurate or incomplete information is received, the recommendations made in curbside and formal consultations differ more frequently, and (e) we found no way to predict whether the information provided in a curbside consultation was likely to be inaccurate or incomplete.

Our hospitalists thought that 38% of the curbside consultations they received should have had formal consultations. Manian and McKinsey[7] reported that as many as 53% of questions asked of infectious disease consultants were thought to be too complex to be addressed in an informal consultation. Others, however, report that only 11%–33% of curbside consultations were thought to require formal consultation.[1,9,10,16] Our hospitalists asked 3 or more questions of the consulting providers in more than 80% of the curbside consultations, suggesting that the curbside consultations we received might have had a higher complexity than those seen by others.

Our finding that information provided in curbside consultation was frequently inaccurate or incomplete is consistent with a number of previous studies reporting physicians' perceptions of the accuracy of curbside consultations.[2,3] Hospital medicine is not likely to be the only discipline affected by inaccurate curbside consultation practices, as surveys of specialists in infectious disease, gynecology, and neurosurgery report that practitioners in these disciplines have similar concerns.[1,10,14] In a survey returned by 34 physicians, Myers[1] found that 50% thought the information exchanged during curbside consultations was inaccurate, leading him to conclude that inaccuracies presented during curbside consultations required further study.

We found no way of predicting whether curbside consultations were likely to include inaccurate or incomplete information. This observation is consistent

with the results of Bergus *et al*[16] who found that the frequency of curbside consultations being converted to formal consultations was independent of the training status of the consulting physician, and with the data of Myers[1] who found no way of predicting the likelihood that a curbside consultation should be converted to a formal consultation.

We found that formal consultations resulted in management changes more often than differences in recommendations (ie, 60% vs 55%, respectively). This small difference occurred because, on occasion, the formal consultations found issues to address other than the one(s) for which the curbside consultation was requested. In the majority of these instances, the management changes were minor and the curbside consultation was still felt to be sufficient.

In some instances, the advice given after the curbside and the formal consultations differed to only a minor extent (eg, varying recommendations for oral diabetes management). In other instances, however, the advice differed substantially (eg, change in antibiotic management in a septic patient with a multidrug resistant organism, when the original curbside question was for when to order a follow-up chest roentgenogram for hypoxia; see Supporting Information, Appendix, in the online version of this article). In 26 patients (55%), formal consultation resulted in different medications being started or stopped, additional tests being performed, or different decisions being made about admission versus discharge.

Our study has a number of strengths. First, while a number of reports document that physicians' perceptions are that curbside consultations frequently contain errors,[2,3,5,12] to our knowledge this is the first study that prospectively compared the information collected and advice given in curbside versus formal consultation. Second, while this study was conducted as a quality improvement project, thereby requiring us to conclude that the results are not generalizable, the data presented were collected by 18 different hospitalists, reducing the potential of bias from an individual provider's knowledge base or practice. Third, there was excellent agreement between the independent reviewer and the 2 hospitalists who performed the curbside and formal consultations regarding whether a curbside consultation would have been sufficient, and whether the formal consultation changed patient management. Fourth, the study was conducted over a 1-year period, which should have reduced potential bias arising from the increasing experience of residents requesting consultations as their training progressed.

Our study has several limitations. First, the number of curbside consultations we received during the study period (50 over 215 days) was lower than anticipated, and lower than the rates of consultation reported by others.[1,7,9] This likely relates to the fact that, prior to beginning the study, Denver Health hospitalists already provided mandatory consultations for several surgical services (thereby reducing the number of curbside consultations received from these services), because curbside consultations received during evenings, nights, and weekends were not included in the study for reasons of convenience, and because we excluded all administrative curbside consultations. Our hospitalist service also provides consultative services 24 hours a day, thereby reducing the number of consultations received during daytime hours. Second, the frequency with which curbside consultations included inaccurate or incomplete information might be higher than what occurs in other hospitals, as Denver Health is an urban, university-affiliated public hospital and the patients encountered may be more complex and trainees may be less adept at recognizing the information that would facilitate accurate curbside consultations (although we found no difference in the frequency with which inaccurate or incomplete information was provided as a function of the seniority of the requesting physician). Third, the disparity between curbside and formal consultations that we observed could have been biased by the Hawthorne effect. We attempted to address this by not providing the hospitalists who did the formal consultation with any information collected by the hospitalist involved with the curbside consultation, and by comparing the conclusions reached by the hospitalists performing the curbside and formal consultations with those of a third party reviewer. Fourth, while we found no association between the frequency of curbside consultations in which information was inaccurate or incomplete and the consulting service, there could be a selection bias of the consulting service requesting the curbside consultations as a result of the mandatory consultations already provided by our hospitalists. Finally, our study was not designed or adequately powered to determine why curbside consultations frequently have inaccurate or incomplete information.

In summary, we found that the information provided to hospitalists during a curbside consultation was often inaccurate and incomplete, and that these problems with information exchange adversely affected the accuracy of the resulting recommendations. While there are a number of advantages to curbside consultations,[1,3,7,10,12,13] our findings indicate that the risk associated with this practice is substantial.

Disclosure: Nothing to report.

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