The Laryngoscope

Patient Opinions Regarding Surgeon Presence, Trainee Participation, and Overlapping Surgery

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Objectives: To explore patient opinions and underlying values regarding overlapping surgery (OS) scenarios, specifically evaluating the effect of attending surgeon presence and availability, as well as trainee participation on patient comfort level and willingness to consent.

Study Design: Mixed methods.

Methods: Forty adults participated in semi-structured interviews. Interviews included vignettes involving three scenarios of OS (1: attending present; 2: attending absent for wound closure; 3: attending absent and unavailable for wound closure, with covering attending), visual analog scale ratings of participants' comfort with scenarios, and cognitive debriefing. Themes and subthemes were identified using hierarchical coding of transcripts, and quantitative and qualitative analyses were conducted.

Results: Quantitative analysis revealed anticipated decreases in comfort with decreasing attending presence/availability (mean comfort level 94% vs. 78% vs. 63% for scenarios 1 vs. 2 vs. 3, $P < 0.005$), although many patients reported improved comfort with scenario 3 if meeting the covering attending. Participants demonstrated a preference for less trainee involvement ($P < 0.005$, scenario 1) and greater trainee experience ($P < 0.05$, all scenarios). However, not all individuals were uncomfortable with attending absence or trainee independence. Themes important for decision making included trust in the surgeon, surgeon experience, trainee involvement, disease severity, cost, and wait time.

Conclusion: Patients varied highly in their willingness to consent to OS scenarios. In settings of trainee independence and covering surgeons, many patients desired meeting these members of the treatment team, which improved comfort for some. For some patients, tradeoffs and incentives of timeliness, cost, and convenience modified their willingness to have OS.

Key Words: Overlapping surgery, trainee, attending surgeon, comfort, values.

Level of Evidence: 4

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INTRODUCTION

Overlapping surgery (OS), as defined by the American College of Surgeons, occurs when an attending surgeon is present for all "critical portions" of a procedure but leaves to begin another case once those critical portions have been completed. If the attending begins critical portions of the second case prior to completion of the noncritical portions of the first case, the attending must designate a covering attending for the first case.[1]

OS offers potential benefits to the overall healthcare system in the form of increased patient access to specialized care, time- and cost-effectiveness of surgical care, and opportunities for trainee independence.[2–6] Despite these benefits, the absence of a patient's chosen attending surgeon is likely highly meaningful to patients,[7,8] and patients may also not be comfortable with trainees performing portions of the procedure.[8–12] These two distinct but potentially related concerns come together in the practice of OS; however, little is known about patient perceptions of this practice.

The purpose of this study was to examine patient perceptions regarding OS scenarios and investigate the rationale and values that underlie these perceptions. We also sought to determine if patient perceptions were sensitive to tradeoffs such as cost, timeliness, and convenience.

MATERIALS AND METHODS

This mixed-methods study was approved by the Vanderbilt Institutional Review Board.

Participant Recruitment

Patients age 18 or older at Vanderbilt University Medical Center, Nashville, Tennessee, general medicine clinics were

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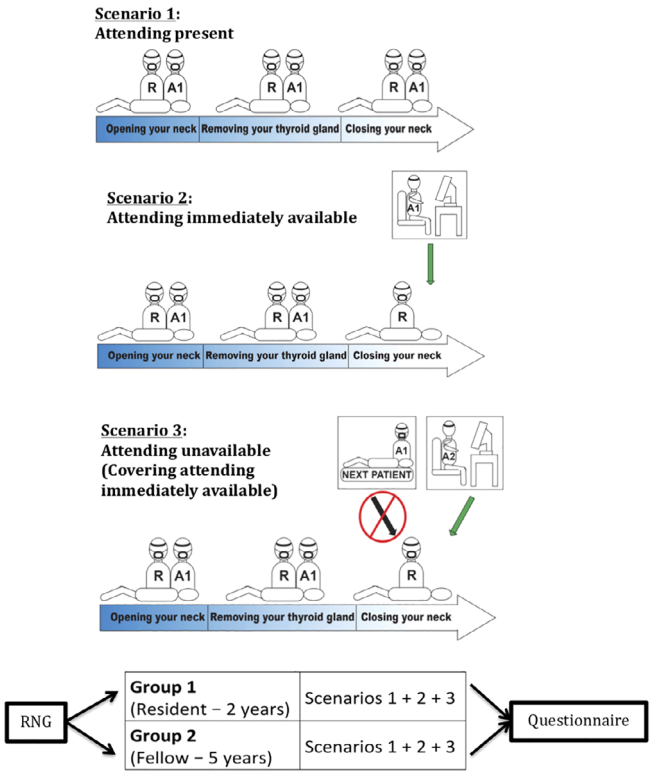

Fig. 1. (A) Three vignette scenarios, as seen by group 1. (B) Participant randomization based on trainee level (years of training) and interview structure. A1 = primary attending; A2 = covering attending; R = resident; RNG = random number generator. [Color figure can be viewed in the online issue, which is available at www.laryngoscope.com.]

recruited via flyers and verbal announcements in waiting rooms; only surgeons and surgical residents were excluded.

Study Design

The primary author (A.A.) conducted face-to-face, audio-recorded, semi-structured interviews consisting of a vignette and cognitive debriefing (Appendix A) in a private area of the clinic. The vignette described a nonemergent partial thyroidectomy (Appendix A) in three scenarios relevant to OS that varied by attending presence and availability (Fig. 1A), although in all scenarios the trainee and attending participate together "through the beginning and 'critical portion'" of the procedure, and the trainee "closes the incision" (the term *overlapping surgery* was neither explicitly used nor explained during the interviews). To independently investigate the effect of trainee level, we randomized participants to scenarios describing the trainee as having 2 years (resident) or 5 years (fellow) of prior surgical training (Fig. 1B). Participants had a laminated copy of the vignette and scenarios (Appendix A, pages 1–2) for reference throughout the interview.

Participants rated their comfort with and willingness to consent to each of the three scenarios using a visual analog scale (VAS): far left (0) = uncomfortable, would not consent; midpoint (50) = unsure; far right (100) = completely comfortable, would give consent (Appendix A, page 5). A rating of 40 visually appeared halfway between uncomfortable and unsure, thus marking the threshold for uncomfortable; and a rating of 60 visually appeared halfway between unsure and comfortable, thus marking the threshold for unsure. Cognitive debriefing was conducted using a 38-item instrument containing open- and close-ended questions about participants' understanding and opinions of the different surgeons and scenarios and rationale for VAS ratings. Participants were also asked to consider if changes in the scenarios would affect VAS ratings (Appendix A, pages 3–4). For example, to determine if procedural risks affected participants' comfort with attending absence, we described a complication ("a leak from a blood vessel during closure leads to infection and a prolonged postoperative stay in the hospital") and presented a risk of 1 in 1000; 1 in 100; and 1 in 10 for this complication—*if the attending were absent from the room.*

In addition to risk, participants were asked to reconsider if they were faced with certain tradeoffs, such as shorter surgery wait times, increasing severity of the underlying thyroid disorder, and copayment savings ranging from $100 to $1000.

The instruments were piloted with nine individuals and modified to optimize comprehensibility prior to participant recruitment. A total of 40 individuals were then interviewed. Demographic and numerical data were collected and stored in research electronic data capture (projectredcap.org). Audio recordings were professionally transcribed, deidentified, and destroyed.

Coding and Data Analysis

Interviews were conducted until thematic saturation[13,14] ("informational redundancy").[15,16] Using grounded theory, a codebook was developed and refined based on independent reading of five transcripts. Major thematic categories were based on salience across participants. Three authors (A.A., A.L., K.B.) coded the transcripts, each by one primary reader and one secondary reader.[17] The codebook evolved as new themes emerged and/or redundant themes collapsed; discrepancies were resolved by consensus.

Visual cutoffs between VAS ratings of "uncomfortable," "unsure," and "comfortable" were confirmed by comparison of participants' VAS ratings and trends in the qualitative results. VAS ratings and thematic patterns were compared by scenario and trainee level with chi-squared/adjusted residuals (AR) for qualitative and categorical data and with t test, Mann-Whitney-U, or one-way analysis of variance (ANOVA) for continuous data. Statistical significance was defined as $P \leq 0.05$ and $|AR| > 2$. Data analyses were performed using SPSS Version 24 (IBM Corp., Armonk, NY) and Excel (Microsoft Corp. Version 16, Redmond, WA).

RESULTS

Participant Characteristics

Thematic saturation was reached after interviewing 40 participants. Interviews ranged from 22 to 59 (mean 36) minutes. The majority of participants were female (65.0%), self-identified as Caucasian (72.5%), and had at least some college education (82.5%). Over 90% of participants had had prior surgeries; over 80% had a primary care physician; and over 75% had some form of insurance (Table I). Comparison of randomized resident versus fellow groups demonstrated no statistically significant differences in demographics except distribution of white and non-white Caucasians ($P = 0.049$).

VAS Results

Comparing VAS results with qualitative trends supported a cutoff of 40 between "unsure" and "uncomfortable"

TABLE I.
Demographics and Additional Characteristics of Participants.

	All Participants (n = 40), n (%); mean ± SD*	Trainee Level		P Value
		Resident (n = 19), n (%); mean ± SD*	Fellow (n = 21), n (%); mean ± SD*	
Age (years)	48.1 ± 17.2	46.2 ± 16.9	49.8 ± 17.6	0.509
Sex				0.079
Female	26 (65.0%)	15 (78.9%)	11 (52.4%)	
Male	14 (35.0%)	4 (21.1%)	10 (47.6%)	
Race				0.100
Caucasian/white	29 (72.5%)	11 (57.9%)	18 (85.7%)	
African American/black	9 (22.5%)	6 (31.6%)	3 (14.3%)	
Hispanic/Latino	2 (5.0%)	2 (10.5%)	–	
Highest education level				0.353
High school or less	7 (17.5%)	5 (26.3%)	2 (9.5%)	
Some college or college degree	20 (50.0%)	9 (47.4%)	11 (52.4%)	
Graduate school or better	14 (35.0%)	5 (26.3%)	8 (38.1%)	
Insurance				0.795
None	9 (22.5%)	5 (26.3%)	4 (19.0%)	
Medicaid/Medicare	10 (25.0%)	4 (21.1%)	6 (28.6%)	
Employer/private	21 (52.5%)	10 (26.3%)	11 (52.4%)	
Employment in medical field (No. yes)	10 (25.0%)	6 (31.6%)	4 (19.0%)	0.361
Primary care physician (No. yes)	34 (85.0%)	18 (94.7%)	16 (76.2%)	0.101
History of prior surgery (No. yes)	37 (92.5%)	16 (84.2%)	21 (100.0%)	0.058
Number of physician visits in prior year [range; median]	7.3 ± 10.1 [1–60; 4.5]	6.4 ± 6.7 [1–30; 4]	8.1 ± 12.5 [1–60; 5]	0.618

Data for all participants, further subdivided by trainee level (resident or fellow) to which participants were randomized. *P* values reflect comparisons between the resident and fellow groups.
*Categorical variables are described as n(%); continuous variables are described as mean ± SD.
SD = standard deviation.

and a cutoff of 60 between "comfortable" and "unsure." Overall, participants demonstrated near complete comfort with scenario 1 (mean VAS, 94.4% ± 8.7%), whereas comfort decreased as surgeon availability decreased (78.7% ± 22.8% and 63.2% ± 32.0% for scenarios 2 and 3, respectively) (Fig. 2). One-way ANOVA analysis revealed statistically significant differences in VAS ratings when comparing comfort with all scenarios relative to each other ($P < 0.001$ for scenario 1 vs. 2 and 1 vs. 3; $P < 0.015$ for scenario 2 vs. 3). No significant association was noted between VAS ratings and trainee group ($P = 0.491$, 0.582, 0.198 for scenarios 1 vs. 2, 1 vs. 3, and 2 vs. 3, respectively). However, when trainee level changed within an interview (i.e., when a participant in the resident [fellow] group was asked to consider a fellow [resident] trainee), changes in VAS ratings revealed a significant preference for fellow trainees for scenarios 2 ($P = 0.003$) and 3 ($P < 0.001$) but not for scenario 1 ($P = 0.096$).

Qualitative Results: Thematic Analysis

Our qualitative codebook contained 13 major themes and 91 subthemes (Appendix B). Of these themes, we identified five factors significant to patients' consideration of OS scenarios: 1) attending presence and availability, 2) trainee involvement in care, 3) risks associated with the procedure, 4) relationship with the covering attending, and 5) tradeoffs. We describe each of these themes below, with additional representative quotes in Table II.

ATTENDING SURGEON PRESENCE AND AVAILABILITY. Participants differed in the importance they placed on attending presence (Table II, quotes 1–8). The majority of those who felt this was important cited the attending's greater experience and knowledge compared to trainees:

> I would want somebody there with more experience who would be able to recognize if a change in procedure was needed. Obviously the fellow is there to gain that experience, so it implies he doesn't have it now. (ID12)

Similarly, others believed that the attending can better recognize and handle complications:

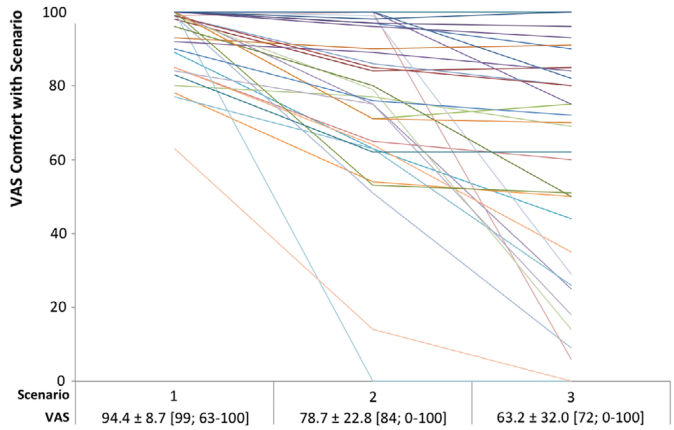

Fig. 2. Baseline VAS ratings of individual participants across scenarios. Each line on the graph represents the trend of one individual participant's baseline VAS comfort ratings for the three scenarios, designated by 1, 2, and 3 on the *x*-axis. The values listed below the scenario numbers 1, 2, and 3 on the *x*-axis represent the overall comfort rating for each scenario, averaged across all individuals within a subgroup (mean ± SD [median; range]). 1 = scenario 1 (attending in the room); 2 = scenario 2 (attending out of the room but available); 3 = scenario 3 (attending out of the room and unavailable); SD = standard deviation; VAS = visual analog scale. [Color figure can be viewed in the online issue, which is available at www.laryngoscope.com.]

> He [the attending] can triage better … if something goes wrong[,] he can hopefully just handle it more quickly, better, more efficiently. (ID17)

Because "the attending's there to take over [if something goes wrong] … and fix it right there" (ID10), many felt a sense of comfort and a feeling that "everything [is] going to go right" (ID35).

In addition to experience, the attending surgeon–patient relationship was significant to many participants. Some expressed feelings of trust: "I've built a relationship with him. … I've got a rapport and a trust with the attending already so I've put my life in his hands." (ID39). Others felt more confidence in their outcome if the physician with whom they had a relationship was present or available:

> I would want to know that the person who's met me, who kind of cares about me, I know that my doctors are at least a little bit invested in whether or not I survive and do well, I would want them to be in the room. Or, if not in the room, available. (ID7)

Additional opinions regarding attending presence related to the contractual nature of healthcare ["I feel like I've made a contract with that physician, to do a procedure, and I have expectations that they will be present during the procedure, see me through it" (ID23)] and payment for service ["You want what you're paying for, and if he's operating on somebody else … then I'm not getting what I … or my insurance company is paying for" (ID40)]. A few others also noted the potential impact of the attending's presence on the team's performance:

> I feel like the resident's more likely to be paying really careful attention [if the attending is in the room], the whole OR [operating room] team is a little bit more likely to be paying attention to what they're doing. (ID28)
>
> [The attending is] the head, and when the mom is not with the kids, many bad things happen. I feel like, if the person who is responsible for the procedure … [doesn't] have his eyes on the rest of the team, I think the rest of the team lose[s] concentration. (ID22)

TRAINEE PARTICIPATION IN CARE. Participation of trainees was perceived by some as an asset and by others as a risk (Table II, quotes 16–17). Similarly, the perceived importance of the portion of the procedure performed by the trainee or attending varied greatly; some preferred that the attending perform all critical portions, whereas others agreed to the trainee performing any portion of the procedure (Table II, quotes 10–14).

Among participants who deemed trainee participation acceptable, some trusted the trainee because they trusted their attending's ability to delegate responsibility:

> I guess I would assume that the attending wouldn't allow the fellow to do the surgery or that portion of the surgery unless that was the appropriate time. … I think if I trust my attending to do my surgery, I should trust them to make decisions as well. (ID16)

Others trusted the trainee's prior experience and qualifications:

> [T]his is not his first surgery. … I feel he's competent, and apparently he's already got his surgeon's license because this is continued education so I don't feel why he wouldn't be able to perform the surgery. (ID21)

Still others supported physician education and training:

> We need to train our doctors to do things. … [I]f they were just kind of willy-nilly just doing it while the attending is over in the corner on their iPhone or something … and the fellow has never done anything like this before, that's obviously horribly irresponsible. That's not the scenario we are talking about and I think it is important for doctors to be able to be trained. (ID16)

Another group of study participants accepted trainee participation with certain stipulations. Some said they would be comfortable if the attending was present supervising the trainee: "[H]aving the attending surgeon present with 100% focus, and able to step in, makes a big difference and gives me more confidence in the fellow"

TABLE II.
Representative Quotations for Factors Significant to Patient Consideration of Overlapping Surgery Scenarios

Theme [Subtheme]*	Representative Quotation
Attending Surgeon Presence and Availability	
Surgical factors [Portion of procedure]	1. "Like you said, opening and closing is the least critical part of the surgery, so I don't think that would be such an issue, but with the removal of the gland being the most critical part, I'd want more experienced hands taking care of that part of the surgery." (ID21)
Surgeon/doctor involvement in case [Relationship with surgeon]	2. "[T]he original attending would be more familiar with my case, and he would know me. He would have a personal investment in me as a patient as opposed to another doctor who's invested in doing the right thing but doesn't know me personally." (ID12)
Surgeon/doctor involvement in case [Attending surgeon activity related to patient's case/availability]	3. "I think that if I'm the patient and somebody's cutting me open, I want to know that the person that I have spoken with is available. I wouldn't expect that my surgeon would necessarily be there all the time." (ID7)
Surgeon/doctor involvement in case [Attending surgeon's physical presence/continuity of care]	4. "I mean it's entirely different. If you're in the room, you can hear something. If the resident cusses or something, you just look right over and you can see, you can react in an instant, or if you're in the room, you're probably glancing over periodically, just kind of making sure things are going okay … if you have eyes on it, it's different than being able to hear or get a phone call from the other room." (ID32)
	5. "I trust the man that I am paying to do the job. If he is going to say I've got this other guy over here that can do just as good a job as I can do. … I may say yes and I may say no. … If he's being trained by the doctor that I'm contracting with I want that doctor to be there." (ID19)
Surgeon/doctor involvement in case [Attending surgeon's focus on anyone's case]	6. "He's just doing his job. He's just documenting. … He can be doing anything. He can be having lunch. He could be on the phone with his wife. I don't care. Doesn't matter. He's just there, available to come back if I need him." (ID14)
Level of experience/competence [Attending]	7. "When I select a surgeon, I do it for reasons. I feel that they've had enough experience, if they have a good bedside manner, have a good reputation. That's the one I want performing my surgery, not somebody else I won't know anything about." (ID37)
	8. "The knowledge that he has. … You never know what's going to happen, and you need to be able to react like that in an instant. Just to have that extra knowledge there in case it's needed, that to me is comforting. Especially if it wasn't something that was life or death, but it would help quality of life, I'd probably still second think if they told me, 'Oh yeah, the attending won't be there for most of the surgery,' I'd probably be like, 'Well, do I really need the surgery?' Because it's good to have someone there in case something happens because there's always risk to any kind of surgery." (ID4)
Trainee Participation in Care	
Surgical factors [Type of procedure]	9. "[I]t [comfort with trainee involvement] would depend on the kind of surgery. I wouldn't have a problem with a fellow taking out my thyroid. I might wonder why the attending couldn't be present for my brain surgery." (ID23)
Surgeon/doctor involvement in case [Level of trainee physician involvement]	10. "I think having a doctor in training involved is fine. It's just if they have supervision, if they're doing things that they know how to do or are comfortable doing, that's fine with me." (ID28)
Surgeon/doctor involvement in case [Support of doctors in training]	11. "They need the experience. As long as they have someone who can guide them, then I think it's completely okay." (ID6)
Surgeon/doctor involvement in case [Prefers supervision for trainees]	12. "Because it's almost as if the attending is directing the resident. It's his mind, his expertise, it's just the resident's hands. He's there to watch every move." (ID37)
	13. "[A]nother scenario is that I've hired this guy and he is in the operating room and he['s] going to allow this guy to do the operation, but he is going to be there the whole time. It's kind of like a driver in training … I've got another steering wheel and I have the brake, so you're not going to have a wreck. That scenario, I would feel more comfortable with." (ID40)
Surgeon/doctor involvement in case [Does not want trainees involved in case]	14. "I just like the most experienced person doing it, especially the critical part, you know." (ID5)
Surgeon/doctor involvement in case [Knowledge of who is involved]	15. "If they [trainees] were physically going to be doing things, I would want to be told. I would want it to say like this … 'You know, the critical portion is going to be done by your attending, but the resident is going to be doing this.'" (ID4)
	16. "I need to know every aspect of my surgery because anytime you open up anybody for anything, there's a risk. I definitely need to know who's in there, who's doing what, because I'm under the impression it's the doctor doing it the whole time. Therefore, when you throw in a resident, that the resident did this part, no, we didn't talk about that before or I didn't give you the consent for that … what if something accidentally happens? Now I'm going to be stuck with something, not really knowing who did what, so I would be upset." (ID36)
Surgeon/doctor involvement in case [Confidence in teaching hospitals]	17. "I guess the argument could be made that somebody who's learning how to perform surgery might pay more attention, but on the other hand they're also learning. They're not an expert in their field or a master in their craft, so to speak yet, so I think it balances itself out. If it was down to having more people being a part of the surgery, I guess that might give me a little bit more confidence than at a nonteaching hospital where maybe there's one surgeon and then a surgical team with them instead of two surgeons." (ID29)
Level of experience/competence [Fellow]	18. "He have five years of training, and I think medicine is one of those fields where the more you training, the better you get." (ID22)

(Continues)

TABLE II.
Continued

Theme [Subtheme]*	Representative Quotation
Level of experience/competence [Resident]	19. "He or she has already had medical training. …They're wanting to progress and they are a medical doctor and they do have experience." (ID2)
Level of experience/competence [Number of surgeries]	20. "I don't know how the skill level changes from the first time to the twentieth time or the fiftieth or the hundredth time." (ID19)
	21. "It would be the attending's impression of the skill level, and not just the number of procedures done." (ID23)
Emotion [Anxiety/worry/concern]	22. "I guess what worries me is that the critical portion. … I don't want them [trainees] to think the procedure ends at the critical portion. I want them to know that, even if they make it through that portion … you can still have things go wrong after that." (ID28)
Risks Associated With the Procedure	
Surgical factors [Risk of procedure]	23. "Anything in medicine is based on risk and reward, so we would have to understand what was the motivation for removal of the thyroid in the first place. Was it a cancer situation? What's the risk of leaving it in there, versus the risk of taking it out." (ID12)
	24. "I realize that in any procedure something could go wrong, but it seems like the stakes are a lot higher when it's dealing with something that is not as easily fixed, like you can't really have a do-over with your brain if something were messed up, whereas if it was half the thyroid, there are hormone replacements and things like that. I feel like it's not quite as dicey." (ID29)
Surgical factors [Level of urgency/necessity]	25. "If it [the condition] was not life threatening and I had the time to find another surgeon I would do it. If it was life-threatening I would say go ahead and do whatever you got to do to save my life." (ID19)
	26. "Well, if I was going to die I wouldn't care if an intern did it, but if I can wait a day I'll let the resident do it and if I can wait a month six weeks I'll wait until I get my real doctor." (ID19)
Chance of Complications [1 in 1,000]	27. "One in one thousand is low enough not to worry too much about it." (ID13)
Chance of Complications [1 in 100]	28. "For [scenarios] two and three, I would definitely want them [attending surgeon] to be in the room if it was that kind of level of risk. 1 in 100 seems like really high risk to me." (ID4)
Chance of Complications [1 in 10]	29. "It seems like a high risk. One in ten is a lot. I would not want to take those odds for most things … it seems to me if the attending presumably has more experience, I would want someone who was more experienced to be doing something that had a higher risk." (ID16)
Level of experience/competence [Attending delegation]	30. "I'm putting a lot of faith in the attending physician to know what the limitations or capabilities are of the fellow despite whether it's their first time or whether it's their 20th time." (ID2)
Relationship with the Covering Attending Surgeon	
Surgeon/doctor involvement in case [Relationship with surgeon]	31. "A surgeon, in the scenarios, it's almost like, well, the surgeon is not a faceless person. He doesn't come in with a mask and you never see anything but his eyes until they put you out or whatever. Again, there should be a personal relationship there … always a bedside manner and a comfort level before the operation that helped with that confidence level." (ID40)
	32. "I think you have to know your surgeon. They have to know your case. They can't just step in, especially if there's an emergency … obviously, he would have to know the case." (ID14)
	33. "I said that if I did meet him [the covering attending surgeon], it would make me feel more comfortable. I still would not want my attending to be unavailable. I still would feel uncomfortable with that." (ID31)
Emotion [Gut reaction]	34. "Sometimes just the gut feel that you get when you meet somebody. The relationship, that initial feeling, in which, not all the time initial feelings are always the best or the right, but I think just knowing that this is the person that's going to cover for me." (ID3)
Surgical Factors and Tradeoffs	
Surgical factors [Would keep appointment if has overlapping surgery/trainee involvement]	35. "I mean, if you have to have it, there's no sense in rescheduling." (ID21)
	36. "If I'd already decided to do the surgery, I'm much more likely to just want to get it done. Having it hang over my head, I think would be a lot more stressful than having an overlapping case." (ID28)
Surgical factors [Would reschedule appointment to avoid overlapping surgery/trainee involvement]	37. "Yes [would reschedule surgery] … because then I would be assured that my attending would be in the room the whole time and that would put me at ease." (ID31)
Surgical factors [Depends on severity of condition]	38. "[I]f you have a really low-grade cancer, that's not a problem right away, I wouldn't want to risk complications of surgery by being hasty. If I could go to another hospital, where I could have the attending and the resident present the whole time … I'm much more likely, if I have a longer time scale, to try and get the best situation possible." (ID28)
	39. "[I]f I was terminal and I was only given a year … I may be a little bit more flexible with the fellow, because I would think that I would be more of an instrument for his teaching than a save my life type of thing." (ID31)
Surgical factors [Length of wait/practicality]	40. "It's not even a time thing. It's the coordination with your job, and that can be a hassle. You ask for time off or you ask for your medical leave and that paperwork is a hassle." (ID14)
Surgical factors [Knowledge of procedure/condition]	41. "I want to know everything beforehand, what's going to happen, know who's going to be in the operating room, that type of thing." (ID34)

(Continues)

TABLE II.
Continued

Theme [Subtheme]*	Representative Quotation
Surgical factors [Benefit of procedure]	42. "It just depends. If it's going to drastically improve quality of life for a year, then I'd probably do it, but if it's still going to totally suck, then I don't know." (ID29)
Finance [Copay savings of $1,000]	43. "I'd do it in a heartbeat." (ID21)
	44. "Like I said, what is a thousand dollars if something goes wrong and then you have to stay in the hospital longer and you're going to end up paying more than a thousand dollars anyway, right?" (ID4)
Finance [Copay savings of $500]	45. "If it was a $10,000 copay versus $500, I'd probably think very hard about that. I would probably consent." (ID37)
Finance [Copay savings of $100 or less]	46. "How much to save? I'm a skinflint, I'd save five dollars." (ID25)
	47. "Please. Fifty dollars is not going to make a difference. Fifty dollars is nothing." (ID14)
Finance [Money does not influence decision]	48. "Cost-cutter surgery … I think for me that it wouldn't matter. The money wouldn't matter as much as feeling comfortable with the surgery." (ID20)
	49. "Health is a very valuable thing. Probably the most valuable thing we own. To lose it, is somewhat myopic. You can always earn more money. You can't always get your health back." (ID12)

*Themes and subthemes from the study codebook are indicated for each quotation.

(ID15). A number of other individuals wanted to meet the trainee, as one person said, "[allowing the trainee to operate] would depend on how much time I'd spent with him and … my feeling about that. That would have to be based on our interaction" (ID20).

Among participants who were less comfortable with trainee participation, the primary reason related to trainee experience and concerns that something in the procedure would "go wrong":

> I don't think they have the amount of confidence yet that … a more experienced surgeon in doing a procedure like that [has]. (ID38)
> He [the trainee] can blink and accidentally hit something that's been pulled out that shouldn't have been pulled out, or too much or not enough of something could have easily been cut … that's too much of a risk to take. (ID36)
> I like that the attending's there to see if anything's going on, but I'm also a little scared that the resident will do something that can't be fixed. (ID28)

RELATIONSHIP WITH THE COVERING ATTENDING SURGEON. Meeting the covering attending was desired by many, improving comfort with scenario 3 for just over half (57.5%) of individuals: five of the 10 participants uncomfortable with scenario 3 raised their VAS rating above 40 (mean new VAS: 74.4% ± 15.7% [median; range: 80%; 49–87%]). Eighteen of the remaining 30 participants increased their VAS rating for scenario 3 to within 10 points of scenario 2. Participants attributed this improvement to an additional sense of comfort and security:

> I think that, when you have face-to-face contact with a person, in this case a surgeon, you can determine ahead of time, or you kind of have a gut feeling ahead of time, whether this is somebody you can trust. (ID23)
> I kind of feel like it shouldn't matter. Like, if my doctor trusts this other person and they are also an attending at that institution, they have the same training, et cetera, but it does matter. … I think that it would make me feel more reassured that they were … a nice person. I don't feel like it's a logical thing. I think it's a kind of an emotional reaction to, you're in a situation where you're having a surgery, that's a very vulnerable situation to be in. … I want to feel like I've met the person who's going to be standing in that place of advocating for me because I can't. (ID7)

Other individuals felt that meeting the covering attending would increase the surgeon's familiarity with their case:

> Rather than some stranger who has no idea who I am … doesn't know my chart … I guess it makes me a little hesitant to put my life, possibly, in the hands of somebody that I've never, ever met. But meeting him … [t]hat he can put a face to my name … I think it puts a little bit more value to me. (ID17)

RISKS ASSOCIATED WITH THE PROCEDURE. Across most participants, the 1 in 1000 risk of a bleeding complication with the attending outside the room was not perceived to be significant (Table II, quote 27). In other words, participants did not change their baseline comfort ratings for any scenario based on this risk. Though still acceptable for some, a 1 in 100 risk of complications marked a threshold for the majority (Table II, quote 28): over 50% of individuals decreased their baseline comfort ratings for at least scenarios 2 and 3; VAS ratings decreased to "uncomfortable" for nine of 31 patients whose initial ratings were over 40. A risk of 1 in 10 was perceived by most participants to be unacceptable for scenarios 2 and 3 (Table II, quote 29), with over 75% of participants decreasing their comfort ratings. The overall

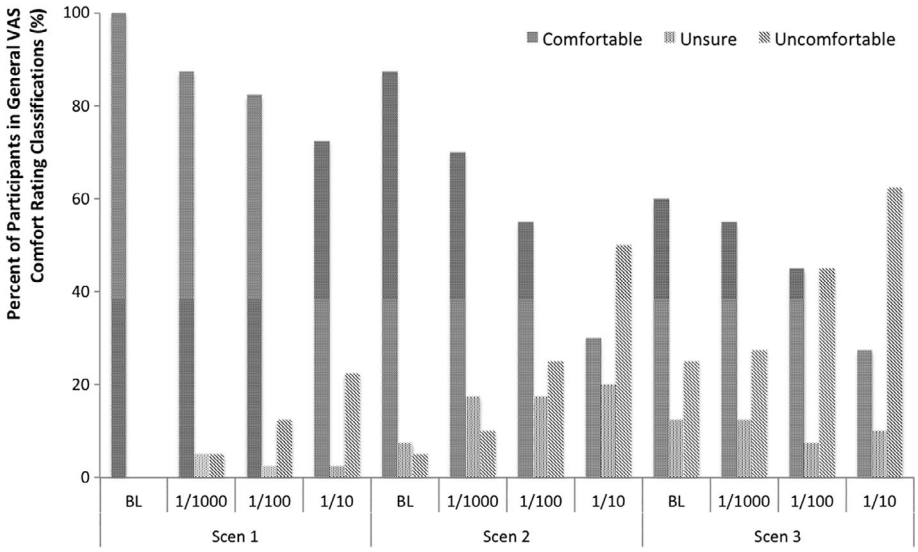

Fig. 3. Percent of participants classified by comfort level for varying risk levels. Each bar on the graph represents the percent of participants classified as comfortable (VAS ≥ 60), unsure (40 < VAS < 60), or uncomfortable (VAS ≤ 40) based on individuals' VAS comfort ratings for the three scenarios (Scen 1, 2, and 3), either at baseline or at varying risks (1 of 1 thousand; 1 of 100, 1 of 10) of a postoperative complication. The complication described to participants involved leakage of a blood that occurs during wound closure at the end of the surgery if the attending surgeon is out of the room, leading to infection and a prolonged hospital stay. BL = baseline; Scen 1 = scenario 1 (attending in the room); Scen 2 = scenario 2 (attending out of the room but available); Scen 3 = scenario 3 (attending out of the room and unavailable); VAS = visual analog scale.

percentage of participants who were comfortable, unsure, or uncomfortable for each scenario at the different risk levels is further depicted in Figure 3.

Spontaneous comments relevant to risk evaluation also emerged during interviews. The type of procedure was important to some because potential complications associated with organs such as the brain or heart seemed more substantial and irreversible—and thus less acceptable (Table II, quote 24). When the procedure was imagined to be emergent or life-threatening, however, most participants were willing to accept whatever surgical scenario was available, regardless of attending presence and availability (Table II, quotes 25–26).

SURGICAL TRADEOFFS. Participant responses to proposed surgical tradeoffs captured a broad range of opinions and did not correlate significantly with any demographic features. Agreeable wait times ranged from 1 week to 1 year, depending on the ramifications of an untreated condition (e.g., cancer vs. elective surgeries such as a "nose job" [ID30]) and the attributed importance of having the attending present. Some would reschedule their surgery to avoid an overlapping schedule because, as one individual said, "Then I know his experienced hands are doing all the procedure" (ID37). Generally speaking, however, participants were inclined to proceed with an OS if their medical condition would worsen by waiting for a date when the attending could be present for the entire case:

> [U]ltimately it's about trying to be healthy and safe, and so in that case I think I could be reasonable and say the [trainee] will do a good job, and it's better to take care of my health. (ID32).

Regarding financial incentives, some participants were responsive whereas others were not (Table II, quotes 42–48). Forty percent of participants would agree to an OS to save $1000, whereas 60% of participants said that money does not affect their healthcare decisions.

DISCUSSION

In this study, we evaluated patient perceptions regarding attending presence, trainee participation, and OS. As expected, participants overall are less comfortable with scenarios when the primary attending is absent. Our patient interviews revealed that participants desired attending surgeons' presence primarily because of perceived experience and ability to handle expected or unexpected complications. In combination with concerns about trainees handling portions of the case, this suggests that in the minds of patients, the desire for surgery "done by the attending" is a proxy for a desire for "good outcomes." Although this logic is understandable, available data suggests that trainee participation[18–21] and OS[22,23] generally have equivalent outcomes. What is unknown at this point is whether discussing such data would be sufficient to make most patients comfortable with trainee independence.

Even in the setting of equivalent outcomes, patients may prefer being operated on by someone they "know," which makes some logistics of OS and trainee independence challenging from a consent standpoint. Our findings highlight the importance of the surgeon–patient relationship in establishing trust and confidence in a surgical scenario. Thus, surgeons may increase patient comfort with trainee participation and OS by introducing the patient to the surgical team. Indeed, over half of our participants said they would feel more comfortable with an

OS scenario if given the opportunity to meet the covering attending.

Importantly, we did not offer the option of scenarios without trainee participation (i.e., the trainee participated in all aspects of the procedure and closed the incision in all scenarios); however, nearly 95% of participants felt comfortable with trainee involvement if the attending were present for the entire case. This suggests that with proper oversight, trainees "performing" portions of procedures may be acceptable to many patients, which is consistent with some prior studies[19,22,23] and contrary to others.[24–27] It should be noted that the portion of the procedure entrusted entirely to the trainee in our scenarios was wound closure, which patients likely perceived to be of minimal-to-no risk. Later, as we introduced a hypothetical increased risk of complications with wound closure, participants were less likely to be comfortable with resident independence—possibly the first hint of a patient-oriented definition of *critical portions.*

In general, we would expect human beings to expect or desire "the best" option, as evidenced by participants becoming less comfortable with a resident when offered the option of a fellow (in agreement with prior studies).[9,10,27] However, practical limitations exist in the healthcare system; surgical efficiency and training of future surgeons is a necessary societal good. We therefore explored the potential effect of tradeoffs on patient comfort with potentially "less desirable" scenarios. Whereas larger, quantitative work is needed to establish effect size, we did find that at least some patients were willing to prioritize other factors (convenience, cost, relationships) in exchange for OS and trainee independence. For patients who still might find certain practices objectionable, exploration of other methods (education, reassurance) that help patients become more comfortable is an important future direction.

This study may be limited in its generalizability. This is data from internal medicine patients in a single academic institution in the Southeast, and there was an overrepresentation of college-educated, Caucasian females. However, within this sample we observed a wide range of opinions that did not appear to correlate with demographic or socioeconomic patient data. The preponderance of certain values may differ in other sample groups, but we believe our data successfully identified an adequate spectrum of opinions that can be explored in larger patient populations, of greater demographic diversity, and from a broader range of healthcare settings.

Our qualitative sample size does not align with the large samples needed for robust statistical analysis. Additionally, our choice of 40 as the threshold for "uncomfortable" was reasoned but arbitrary, which may have affected interpretation of our data. If we had set a higher threshold, more people would have been classified as uncomfortable with certain scenarios. However, visually, the number 40 roughly correlates with how "uncomfortable" was labeled on the VAS (Appendix A, page 5). Furthermore, the point of this threshold was not to define "comfort" categories but to logically correlate the qualitative data with quantitative results for analytical purposes. This aided interpretation of our results; in particular, we prompted individuals with tradeoffs and observed shifts from uncomfortable to unsure or vice versa. Finally, although we did engage participants in detailed hypothetical vignettes to obtain qualitative data, participants' perceptions and values may differ from what they would think if faced with actual health crises.

Although this data may not be expansive enough to require a change in surgical practice, it seems beneficial to introduce trainees and covering attending surgeons to patients, who may thus feel more reassured. More work is needed to provide clear guidelines for surgeon practice, and these studies include: 1) surveying larger populations of patients regarding tradeoffs; 2) exploring how patients respond to education about surgical logistics and introduction to other surgical team members; and 3) examining the diversity of patient perceptions further to better characterize what other methods, nudges, or accommodations may help all patients be more comfortable with their surgical care.

CONCLUSION

In conclusion, we present an initial investigation of patient perceptions regarding OS and trainee involvement in care. As expected, participants felt more comfortable when the attending was involved in the surgery for a greater duration of time. A number of factors influenced patient comfort with surgical scenarios, including attending presence and availability, level of trainee participation in care, relationship with the covering attending, risks associated with the procedure, and surgical tradeoffs. Although some patients were willing to consider tradeoffs in exchange for OS and trainee independence, more robust quantitative studies are needed to delineate these different value systems. Nevertheless, the findings of this exploratory study provide exciting avenues for further research in patient education and informed consent.

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