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Abstract

For older adults with osteoporosis, a fall resulting in hip fracture is a life-changing event from which only one-third fully recover. . Current best evidence argues strongly for elderly patients to bear weight on their repaired hip fracture immediately after their surgery to maximize their chances of full or nearly-full recovery. Patient stakeholders in Canada have argued that some surgeons fail to issue 'weight-bearing as tolerated' (WBAT) orders in all eligible cases, protecting their bony repair but contributing to increased mortality and long-term disability rates. In collaboration with a national stakeholder organisation, Bone and Joint Canada, we interviewed twenty orthopaedic surgeons across Canada who perform hip-fracture repair surgery, with the aim of understanding their attitudes and behaviour toward patient management regarding weight-bearing. Qualitative content analysis, in which themes are identified and agreed by multiple coders, suggested that both patient characteristics and surgeon factors influence surgeons' post-operative weight-bearing orders. While almost all respondents agreed that WBAT is indeed therapeutic for most hip fracture repair or replacement patients, surgeons also described certain patient characteristics that would diminish the value of immediate weight-bearing, including poor bone quality and certain types of fracture pattern. Surgeon factors that affect post-operative mobilisation orders include choice of construct, previous experience of construct failure, and lack of local audit data regarding past weight-bearing decisions and patient outcomes. Thus, though familiar with best practice guidelines, surgeons also have 'rules to break the rules'. In an era when 'good' medicine leans toward science rather than art, the role of individual experience in decision-making with regard to hip fracture care continues to be important, and would benefit from being discussed openly.

Background

Until the middle of the twentieth century and the advent of effective antibiotics, hip fracture was regarded as an almost uniformly mortal injury. "We come into the world under the

brim of the pelvis and go out through the neck of the femur,” according to a piece of medical folk wisdom [1]. Approximately 1.3 million hip fractures occur annually worldwide (1) and in the elderly, are almost always associated with osteoporosis. In spite of the advance in care, hip fracture continues to be associated with excess morbidity and mortality, admission to institutions of long-term care, chronic pain, and high economic costs (2).

In addition to the physical injury, social and psychological damage to patients can also be severe. Borkan et al. describe hip fractures as ‘traumatic, sudden, and debilitating’ events for patients and for their families(3); Katz refers to the social transformation of the patient from ‘person’ to ‘faller’ as part of ‘embodied aging’, in which ‘falls have profound consequences for biographical aging and a person’s negotiation of identity in old age’ (p. 194) (4). Hip fracture patients describe themselves as surprised by having fallen, and may experience guilt over having made themselves ‘vulnerable’ to falling Webster, Rice (5). The path to recovery is uncertain and in most cases, incomplete. Only one-third of hip fracture patients return to the previous level of functioning. Co-morbidities complicate the issue so that patients themselves may be unsure about their goals and wishes for life after hip fracture (6). Overall, the type of operation and the post-operative management have far-reaching consequences, well beyond recovery from the surgery itself.

Early post-operative mobilization, in particular weight-bearing as tolerated (WBAT) within 48 hours after surgery, improves functional recovery from hip fracture repair (7) [9]. In individuals ≥ 65 y, early ambulation in conjunction with immediate weight-bearing has been associated with accelerated recovery, resulting in shorter acute care length of stay and increased probability of being discharged directly home, and reduced mortality (8). Comprehensive and multidimensional post-fracture care, focusing on the whole patient along with the bone repair, includes immediate WBAT (7) (9). Early post-operative weight-bearing is, in short, “widely accepted as the standard of care” internationally. (10) Canadian recommendations are in line with the international ones (11-13); in its Hip Fracture Toolkit, the stakeholder agency Bone and Joint Canada (BJC) recommends full, immediate WBAT in its best practice guidelines (14), stating explicitly that it is safe and does not lead to increased likelihood of mechanical complications of the surgical repair.

Despite the considerable published evidence demonstrating the superiority of early weight-bearing, and, to the best of our knowledge, no published evidence to the contrary, some elderly patients are still told to limit their weight-bearing activities following hip fracture repair(15). In this paper we take a knowledge translation (KT) perspective to explore surgeons' self-reported decision-making pathways in order to understand why and when there are barriers to ordering WBAT. We undertook this qualitative study to investigate the nature and underlying reasons for the existence of a care gap between best practice guidelines and surgeons' weight-bearing orders across Canada.

Methods

We conducted interviews with twenty orthopaedic trauma surgeons across Canada who currently perform hip surgery. An interview guide was generated through iterative consensus by the research team (including orthopaedic surgeons (RJ and HK), a stakeholder representative (RM), and other professionals). The resulting guide was pilot-tested on a surgeon whose responses were not included in the analysis. It was then employed by one researcher (LC) to structure the conversations with surgeons recruited with the assistance of Bone and Joint Canada and through snowball sampling. (see Appendix). All interviews were conducted by telephone. The author introduced herself as a medical anthropologist and invited the respondents to use layman's language in their responses. The interviews opened with the researcher's statement that, based on literature and best practice guidelines, WBAT is widely understood as the ideal outcome following hip-repair surgery. The surgeons were then invited to discuss why this should be so, when and whether exceptions were warranted, the array of factors influencing patient outcome, whether and in what form weight-bearing guidelines existed within their institutions. The interviews lasted approximately 30 minutes, were conducted by telephone and recorded (with explicit permission), and then transcribed by a professional agency. The interviewer took notes for added clarity and kept notes of the research process during the course of data collection. Participants received an honorarium. Data collection ceased when the responses to the interview questions stopped producing new themes and it was determined that saturation had been achieved (16).

Each transcript was read by at least two of the authors and a coding scheme agreed, after which all interviews were read and coded or re-coded by the first author. The analysis of the interview transcripts and process notes followed an iterative, qualitative-descriptive (QD)

approach (17) (18). QD aims to remain ‘close’ to the data during their interpretation and to generate themes rather than theories using a process of qualitative content analysis (17, 19); thus, it is a particularly appropriate method for use in this exploratory study. Themes that emerged from the data were discussed and agreed amongst three of the authors (LC, KS, and SJ) and transcripts were then reviewed in light of the previously-agreed coding scheme, which had altered in the course of data analysis. Finally, distillations of the responses to questions were extracted and organised alongside respondents’ characteristics (practice setting, length of time in practice, number of hip operations per month.) creating a “text matrix” (20). This matrix, a table in which each major theme has a column, and each row represents a respondent, served to clarify relationships between responses and responder characteristics, as well as to make evident the relationships amongst themes. The matrix became a guide in writing the paper.

This research received ethics approval from Toronto Rehabilitation Institute (UHN-TRI REB # 12-036) in Ontario. The research was funded by KT (Knowledge Translation) Canada.

Results

Participants

Surgeons with links to BJC, the national stakeholder organisation, formed the initial sample. Of 35 surgeons contacted, 20 were interviewed. The remainder either did not respond or were unable to schedule a timely interview. Surgeons came from seven out of Canada’s ten provinces; they described their practice settings as academic/teaching hospitals (n= 8), community hospitals (n=7), regional referral centres (n= 3), or Level 1 trauma centres (n=2). Length of time in practice ranged from two years to 34 years, with a mean of 10.5 years and median of 9.5 years. The surgeons reported performing between one and 20 hip operations (repair or replacement) in a typical month (mean of 5.4; median of 4). See Table.

Similarities and differences amongst surgeons regarding immediate WBAT

While all respondents agreed with the initial, opening statement that WBAT is the ideal post-operative order, differing attitudes emerged with regard to the importance of weight-bearing to ultimate patient outcome. Group 1 (n = 4) identified WBAT as of paramount importance and

identified few if any barriers to its implementation. Those in Group 2 (n= 9) spoke of factors that sometimes prevent them from choosing immediate WBAT. Finally, Group 3 (n= 7), though having agreed that WBAT is ideal, later in the conversations backtracked on that viewpoint, speaking of their doubt about the actual importance of immediate weight-bearing to recovery, in comparison to other factors. In aggregate, respondents estimated that they prescribed WBAT between 75% and 90% of cases.

The surgeons in all three groups included both younger and older surgeons, and comprised those practicing in academic, regional, and community hospitals; thus, no particular demographic trend could be identified from this data-set.

Barriers to and benefits of issuing immediate WBAT orders

The Group 1 surgeons were those who said consistently and throughout the interview that immediate post-operative weight-bearing was ‘virtually always’ the correct order. If a surgeon cannot prescribe WBAT, said S4, then “it was the wrong operation.” According to another, S9, protecting the repair by not allowing full weight-bearing does “a disservice” to the patient. The two others in this group, S15 and S20, also planned on WBAT for all patients, because they believe that patients will weight-bear whether ‘allowed’ or not, particularly elderly patients with poor upper-body strength, or those with dementia or post-operative delirium. Surgeons in Group 1 expressed firmly their conviction that weight-bearing is a critical component of patient outcome, as “beneficial” to healing and as preventive of complications including pneumonia and bedsores. Weight-bearing status has an “enormous impact on rehab” (S15).

Those in Group 2 felt strongly that WBAT was almost always desirable, but included some statements indicating that sometimes it is unwise. S16 said “you are always walking a fine balance” between encouraging immediate weight-bearing and protecting the repair; s/he says “I try my best” but sometimes the results can be “catastrophic” without some weeks of restricted mobility. Both S7 and S13 emphasized the importance of the “right” implant, as some are more prone to failure. S12 and S6 both said they would order restricted weight-bearing in cases of badly comminuted fractures or evidence of “bad” osteoporosis.

The Group 3 respondents, like those in the other two groups, agreed initially that WBAT was the ideal post-operative outcome, but as the conversation continued, they described circumstances in which restricted weight-bearing is, for them, preferred. Such situations included those in which the “stability” of the repair were in doubt, if the fracture occurred at a particular site e.g. if it were sub-trochanteric, or in the case of particular constructs or implants were used. Three surgeons in this group questioned the importance of immediate weight-bearing for patients’ recovery, saying that weight-bearing “is secondary” to the main goal of “healing” (S10); that weight-bearing status constituted only part of the recovery process; that a “combination of factors” might make it wiser to restrict some patients’ weight-bearing (S14); and that the evidence for the effectiveness of WBAT is dubious, and there is “not enough science” to show that weight-bearing is “markedly important” (S5).

Possibility or experience of construct failure

Twelve respondents spoke explicitly about their reactions to the possibility of construct failure. The surgeons in Group 1, those who spoke of the importance of WBAT for successful recovery, regarded occasional failure as inevitable but said that it should not sway weight-bearing decisions in future cases. “It’s critical to know that we’re not going to find a 100% success rate” and to understand why, said S20. “We’re famous for allowing an N of one failure to dictate subsequent treatment.”

Responses in Group 2, those surgeons who described WBAT as important but with exceptions, were characterised by a tempered attitude toward the possibility of construct failure. One, S16, spoke of being “more conservative” with weight-bearing than s/he was several years earlier when beginning to practice, after the “emotionally taxing” experience of a patient’s repair failing and the patient subsequently dying in the course of the second operation. “There will be failures,” said S13, but surgeons need to get the “right” feedback from them, only altering procedures for the correct reason; to understand the ‘subtlety in the fracture’ that made weight-bearing inadvisable in this particular case Overall, those in Group 2 who discussed an experience of such a failure employed more nuance and conjecture in their responses, compared to the other two groups.

The Group 3 surgeons, those whose commitment to WBAT seemed to diminish across the course of the interview, expressed similarly mixed views on repair failure. One, S10, said “it taints you as a surgeon”. Another, S11, commented that “[W]e are brought up, as surgeons” to think that if weight-bearing is limited, patients are less likely to “fail their repair”. Another surgeon in this group spoke of patient non-compliance (i.e. non-compliance with restricted weight-bearing) as a problem, rather than a problem arising from the surgeon’s decision. One, S14, said that after twenty years in practice, failure ‘hasn’t happened much to me’ and that s/he is ‘pretty consistent’ while S03 said simply, ‘we’ll occasionally say that this case is a disaster.’

Access to information about patient outcomes

Finally, the lack of local information about the impact of WBAT orders limits surgeons’ abilities to judge the effect of their decisions their own patients. When respondents were asked to compare outcomes for the patients with immediate WBAT orders against those with restricted or delayed weight-bearing (“In your experience, how does the choice of weight-bearing prescription affect the patient outcome?”) there was uncertainty across all three groups. “I guess” or “probably” peppered their replies. No differences could be discerned amongst the different groups in this domain.

It is a ‘tough one’ to answer, said S14: “The outcome of patients is dependent on so many things, general physical health, age, so much. Weight-bearing is a small component of that”. For example, S02 said “Their [patients’] overall outcome is probably the same in the end, however in the short term, they’re delayed probably. If you can’t weight-bear them it prolongs their hospital stay probably... I think it’s probably the best mode of management for the patients.” Another surgeon is apologetic about his/her inability to reply to the question about patient outcomes. “We don’t have any stats unfortunately. I can’t tell you what our morbidity and mortality is for hip fractures but ... I know that in general, it’s uncommon for me to hear about one of my hip fracture patients having major complications ... It’s quite possible things happen after they leave my care” (S03). Many respondents reported that they typically included a plan for an appointment six weeks post-operatively. However, depending on schedules, and patients’ destination after acute care, a surgeon might not see his or her particular patient in weeks, months, or ever after their repair, unless there an acute problem emerged.

From an institutional perspective, only one respondent indicated that their hospital systematically audited the patient outcomes based on weight-bearing orders. Another spoke of local, city-wide guidelines to promote WBAT, but commented, “[W]hen that’s been audited... I don’t know” (S04). Most of the surgeons worked in institutions that have adopted ‘care pathways’, guidelines that suggest when patients should be reaching particular milestones such as weight-bearing. Surgeons may not feel bound to the guidelines. “The care path is good for 95% of the people... I think you’re a terrible doctor if you can’t find those [other] 5% and you just go by the care path” (S16).

Discussion and conclusions

This exploratory research has identified variation in Canadian orthopaedic surgeons’ commitment to ensuring that their hip-fracture patients are allowed to bear as much weight as they can tolerate, within 24 to 48 hours after surgery, as recommended by guidelines. The twenty surgeons interviewed all agreed that weight-bearing as tolerated immediately after surgery constituted ‘best practice’, but further discussion elucidated ‘slippage’ in terms of commitment to that best practice. The main reasons cited for restricted weight-bearing included concern about the repair failing, plus a lack of certainty about the importance of weight-bearing to recovery. Reported familiarity with and usage of particular constructs (e.g. the dynamic hip screw) was linked to a more conservative attitude toward protected weight-bearing. Past experience of a patient’s repair failure also tended in a few cases to make surgeons more cautious about ordering WBAT. Several surgeons spoke of their distrust of published evidence; except in one case, there was no information available to the doctors about the rates of patient recovery by WBAT status at their own hospitals.

Overall, the surgeons know the ‘rules’ of best practice regarding weight-bearing orders, and in general see themselves as abiding by them: in the early stages of the interviews, almost all agreed that the ideal situation for a hip fracture patient is weight-bearing, early and unrestricted, for the well-being of the whole patient as well as to promote fracture healing. What became clear is that they may also keep handy a set of ‘rules to break the rules’ (21), a set of exceptions to enacting best practice which adds up to a failure to adhere to best practice in a significant group of patients. In response to the direct question “How often do you order immediate post-operative weight-bearing as tolerated for your patients?” most surgeons tended to offer 90% as their best

estimate. Such self-estimation has not been checked in this population of Canadian surgeons although an international survey found that, only 40% of orthopaedic surgeons who responded allowed full weight-bearing following internal fixation of femoral neck fractures(22). In Australia, an audit (15) found that WBAT was prescribed in 77% of their hip-fracture repair patients (23). Such numeric disparities suggest that the actual rate of WBAT prescription is yet to be ascertained.

For surgeons who decide to protect their surgical repairs, rather than ordering immediate WBAT, factors that may influence the deployment of ‘rules to break the rules’ include the type and anatomical location of the fracture, the quality of the patient’s bone, and the surgeon’s own prior experience with failure. Luu et al. (24) talked to surgeons across a variety of specialties about errors and their responses to errors, and the authors conclude that the ‘adverse patient event’, which is ‘an inherent component of surgical practice’ is perceived by most surgeons as affecting their clinical judgment regarding future cases, a phenomenon known as ‘overcompensation’(p.1186). The data collected from our set of twenty orthopaedic surgeons suggests they engage in similar behaviour.

The orthopaedic surgeons in our sample communicated a sense that their weight-bearing orders ‘do not matter’, as the patients and others involved in post-operative care either cannot or will not obey the surgeon’s weight-bearing prescription. Their degree of confidence in the research literature also affects our respondents’ self-reported adherence to ‘best practice.’ Our surgeons, while intellectually aware of the risks to elderly patients posed by extended immobility, consider themselves in the position of balancing the ‘whole’ with the ‘part’, the fragile bony fragments they have been repairing fresh in their minds, and perhaps thus the ‘whole patient’ less present. On the one hand is the surgeon’s lived experience: drilling through ‘bones like butter’, shadowed perhaps by a previous failure, and on the other, best practice guidelines to ‘weight bear your patient’ . Finally, the lack of local audit may not allow surgeons fairly to compare their patient’s experience and outcome regarding weight-bearing order with that described in published studies. The existence of a care gap, then, is perhaps not surprising.

The fact that surgeons are often no longer in the picture when medical issues associated with extended immobility occur, but are called when surgical fixations fail, may predispose toward a bias that is not effectively countered by the existence of data in peer-reviewed publications. In

terms of deploying a knowledge translation intervention, Dawes' and Lens' (25) work with surgeons and KT in the UK suggests that a process of enacting 'small audits' may be the most effective way to change practice. The principles behind such an intervention rely on changes being instituted by and from within the surgical community, and furthermore on such changes being small, monitored, and potentially temporary or reversible. The authors argue that proceeding in such a fashion allows modification in practice to be 'comfortable' and thus both acceptable and sustainable. In the case of hip fracture repair and weight-bearing orders, it is possible that using the 'small audit' method might allow for greater clarity in terms of seeing the impact of weight-bearing order on patient outcome. Cantu et al. (26) also present evidence on the effectiveness of grand rounds in changing practice amongst orthopedic residents. Manning et al. (27) discuss the process of 'overcoming resistance' to integrated care pathways and the effectiveness of performance feedback for knowledge transfer, another route perhaps to creating a series of small audits that encourage comfortable and graceful change in practice.

Further research

This exploratory qualitative investigation into the barriers to and facilitators of WBAT prescription is a step toward a potential intervention leading to improved practice. In other components of our research plan we aim to look broadly at the scope of the problem by conducting a survey, and to take more of a localized perspective through a series of chart audits at selected hospitals.

Conclusion

Our findings suggest that aspects of institutional culture including training and personal experience play a significant role in determining practice; and that 'best evidence' can be trumped by a set of 'rules to break the rules'. Individual experience receives less validation as an authorized component of decision-making in an era when 'good' medicine leans toward science rather than art. Institutional chart reviews or other form of audit could assist surgeons in contextualizing the relevance of their weight-bearing orders to patients' outcomes; however, helping surgeons to cope productively with failure is a thornier, broader, and ongoing issue for the surgical community.

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Table

<u>Participants (N= 20)</u>	
<u>Gender (M/F)</u>	19 / 1
<u>Province</u>	
Alberta	2
British Columbia	5
Manitoba	1
Nova Scotia	1
Ontario	9
Prince Edward Island	1
Quebec	1
<u># Years in practice*</u>	
<i>Range</i>	2 – 34
<i>Mean</i>	10.5
<i>Median</i>	9.5
<u># Hip fracture ops/month (mean)</u>	5.4
<u>Hospital type</u>	
Academic/teaching	8
Community	7
Regional referral	3
<u>Level 1 trauma</u>	2