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Design and Evaluation of a Hospital-Based Educational Event on Fracture Care for Older Adult

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Abstract

Introduction: Surgeons, internal medicine physicians, nurses, and other members of the healthcare team managing older adults with a fracture all have barriers to attending educational courses, including time away from practice and cost. Our planning group decided to create and evaluate a hospital-based educational event to address, meet, and improve the care of older adults with a fracture. **Materials and Methods:** A committee of surgeons and geriatricians defined 3 learning objectives to improve knowledge and attitudes in co-managed care. They designed a 1-day educational event consisting of a departmental visit, a review of cases, a planning session to identify gaps and plan changes, and presentations on selected topics. Thirteen hospitals worldwide completed an 8-question online application form, and 7 sites were selected for delivery over 3 years in Denmark, Colombia, Thailand, Paraguay, Switzerland, and the Dominican Republic. **Results:** Each event was conducted by 1 or more visiting surgeons and geriatricians, and the local team leaders. The most common challenges reported in the applications were preoperative assessment or optimization, delayed surgery, lack of protocols, access to a geriatrician, teamwork, and specific aspects of perioperative and postoperative care. In each department, 4 or 5 goals and targets for implementation were agreed. The presentations section was customized and attended by 20 to 50 team members. **Discussion:** Topics selected by a majority of departments were principles of co-managed care (7), preoperative optimization (7), and management of delirium (4). Follow up was conducted after 3 and 12 months to review the degree of achievement of each planned change and to identify any barriers to complete implementation. **Conclusions:** Hospital-based events with visiting and local faculty were effective to engage a broader audience that might not attend external courses. A performance improvement component with goal setting and follow up was acceptable to all host departments.

Keywords

fragility fractures, geriatric trauma, systems of care, interprofessional education, performance improvement, hospital-based education

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Introduction

Orthogeriatric co-management improves the outcome of older adults with a fragility fracture and is the gold standard for care with proven outcomes and many published consensus guidelines.[1-7] Implementation of a geriatric fracture program has been reported in many settings and various barriers reported.[8,9] Successful implementation requires strong physician leadership to articulate both a short- and long-term plan, good communication to implement standardized plans of care working with all members of the healthcare team and to foster

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relationships both within the hospital and with other institutions in the community.[10] In both structured and non-structured programs, there are many challenges to optimize the care of older adults with a fracture, including lack of clarity about roles, specific issues such as osteoporosis, falls, and differences in preoperative optimization, treatment timeframes, and post fracture medical treatment.[11-15] Quality improvement initiatives can be undertaken to optimize the healthcare services offered and thereby improve the outcomes and health status of older adult patients.

Co-managed care in these programs is based on 5 principles: Surgical fracture management; early operative intervention; medical co-management with geriatricians; patient-centered standard order sets to employ best practices; and early discharge planning with a focus on early functional rehabilitation. Outcome parameters for the evaluation of orthogeriatric co-management for hip fractures have been identified.[16] Education plays an important role in supporting the implementation of these programs. However, while some members of the team attend external educational events, many of the professionals involved in the care of older adults may encounter barriers such as time away from practice or cost. The Institute of Medicine and other organizations promote interprofessional learning for team-based healthcare delivery to enable participants to learn both individually and as collaborative members of a team with a common goal of improving patient outcomes.[17]

Educational interventions on the undermanagement of osteoporosis in fragility fractures have been shown to be effective and many organizations support the development and research of programs, including the American Geriatric Society (AGS) CoCare: Ortho® program that considered a hospital visit component.[18-22] AO Trauma's Orthogeriatrics Education Taskforce developed a dedicated curriculum in 2010 and have delivered many courses and webinars worldwide, attended mostly by orthopedic trauma surgeons and residents, and some geriatricians and other healthcare team members.[23,24] They also published a textbook on Osteoporotic Fracture Care—Medical and Surgical Management.[25] To try to address the gaps for the entire team, the taskforce designed a 1-day Hospital-based Educational Event on Fracture Care for Older Adults to bring education to the hospital department. The aim being that upon completion of the event, the team members will have:

- Recognized the existing good practices within their department.
- Identified areas for improvement on selected problems and set goals to achieve for the future.
- Defined plans to address selected problems and set targets for performance.

Materials and Methods

A planning committee of orthopedic surgeons and geriatricians from the AO Trauma Orthogeriatrics Education taskforce was established to analyze the challenges faced by trauma departments managing older adults with fragility fractures and to design a hospital-based intervention.

Design Phase

To address the challenges, the planning committee set goals and objectives for the program target audience. They defined a 1-day program consisting of 4 components. Firstly, a visit to the department to review what is going well and what could be done differently in each phase of care. Secondly, a case review session with the local team to get a deep understanding of standard care and any problems or challenges the group encounters. Thirdly, the local team leaders and visiting faculty meet to review what is going well and what could be done differently. They also identify the main challenges, potential solutions, and set target performance levels. The final part of the program was a 90-minute session for presentations to the entire department with topics selected by the host team.

Applications and Site Selection

To select the hospitals participating in the program the committee designed an 8-question pre-event assessment to identify the needs, expectations, and profile of the existing system. An online application form was created in SurveyMonkey and advertised to the AO Trauma faculty network and colleagues who had attended past courses. Thirteen applications were reviewed by the planning committee and 7 sites were selected based on the problem list they submitted with preference for departments where the visiting faculty felt they could support and bring potential solutions.

Hospital-Based Event

At least 1 geriatrician and 1 orthopedic trauma surgeon were assigned as visiting faculty and a preparation meeting was conducted online with the local team leaders, and an event date set with a faculty pre-course meeting the evening before. The final program for the day was agreed by the faculty and communication was organized by the local host. The local team prepared 3 cases for the review session. The presentations section of the event was customized and attended by 20 to 50 team members. One hospital with an established, managed-care system was selected for a pilot event in early 2018 and an additional 6 events were conducted between 2018 and 2019.

Data Collection and Reporting

During each hospital-based event, the external faculty completed a structured data collection form based on their visit and discussions with the leaders in each unit and phase of care. A performance improvement plan template was completed by the local team and visiting faculty to document their main challenges, current performance, measures, and targets for future performance. The data were summarized and returned to each hospital within a week after the visit. After 3 months, each site was asked to report the status of implementation on each of their intended changes with a descriptive report and the percentage achieved. This process was repeated 12 months after the event.

Table 1. Profile of Trauma Departments Based on Completed Application forms.

Question	Responses (number of sites or range of responses)
What are 5 main problems your department has in relation to the management of older adults with fragility fractures?	11 of the 13 sites identified 5 problems including: Preoperative assessment or optimization, delay to surgery, anticoagulation, adaptation of treatment for older adults, lack of protocols, postoperative care (2), delirium, osteoporosis and secondary prevention, access to a geriatrician, teamwork, and costs
How many fragility fractures are treated in your department in a year?	Ranged from 50 to 500
What outcomes data can you provide that shows your current outcomes? complication rates, length of stay, etc.	Length of stay, preoperative assessment by internist or geriatrician, preoperative time to surgery (or delay), infection, refracture or readmission, thromboembolism, nonoperative treatment, falls or osteoporosis assessment
Do you have a geriatrician?	Yes—11 of 13 and the other 2 reported some access to 1 or more internal medicine physicians
Do you have a dedicated orthogeriatric ward?	Yes—5 of 13
Do you have a fast-track time to surgery for older adults?	Yes—9 of 13
Do you have a dedicated surgeon or group of surgeons on this topic?	Yes—7 of 13
Who takes care of osteoporosis?	Orthopedic surgeon (5), endocrinologist (3), geriatrician (2), rheumatologist, internal medicine
Do you have a Fracture Liaison Service?	Yes—4 of 13
Do you have a discharge manager?	Yes—10 of 13
Do you have collaboration with rehabilitation?	Yes—10 of 13
Does your department have any certification related to this topic?	Yes—4 of 13
What do you expect from the 1-day educational event?	Protocols (4), enhance interaction within team (4), team education (3), advice to help build the system of care or resources (3), improve our understanding of the problems and appropriate care (3), hear about successful care pathways (2), provide motivation or inspiration to team (2), review our program and provide an "external opinion" (2), increase awareness (2), adaptations to surgical procedures (2), recommendations related to our specific problems

Table 2. Topics Selected for the Team Education Sessions.

Location	Co-managed care	Preoperative optimization	Anti-coagulation	Postop organ failure Antibiotics	Pain	Delirium	Osteoporosis or prevention
Copenhagen	✓	✓	✓	✓			
Bogota	✓	✓			✓	✓	
Bangkok	✓	✓	✓	✓			✓
Medellin	✓	✓			✓	✓	
Asunción	✓	✓				✓	
Luzern	✓	✓	✓	✓			✓
Santo Domingo	✓	✓			✓	✓	

The site leaders from each hospital consented to include their report and share their experiences. Ethics exemption was granted from the Kanton of Zurich Ethics Commission since the project does not fall within the scope of the Human Research Act (BASEC-Nr. Req-2020-01402).

Results

The 1-day educational event was delivered at 7 hospitals selected from 13 applications over 3 years: Copenhagen (Denmark), Bogota and Medellin (Colombia), Bangkok (Thailand), Asunción (Paraguay), Luzern (Switzerland), and Santo Domingo (Dominican Republic) (Table 1). The most common challenges reported in the applications were preoperative assessment or optimization, delayed surgery, anticoagulation medications, lack of protocols, access to a geriatrician, teamwork, and specific aspects of perioperative and postoperative care such as delirium, nutrition, and secondary prevention. Most of the departments had some established co-managed care and access to a geriatrician, while some were aiming to

Table 3. Outcomes Related to Planned Changes at Completed Sites (% Achieved at Completed Sites).

Location	Number of planned changes	Implementation status of each of the changes after 3 months					Implementation after 1 year				
Hospital 1	4	25%	25%	25%	0%	–	60%	40%	40%	50%	–
Hospital 2	5	50%	30%	60%	50%	30%	90%	30%	60%	50%	30%
Hospital 3	5			All started			90%	85%	99%	80%	100%
Hospital 4	5	80%	Started				50%	100%	100%	50%	Delay
Hospital 5	5	100%	Started		90%	100%	100%	80%	80%	95%	Delay

Table 4. Examples of Changes Made After 1 Year and Changes That Require More Time.

Examples of changes made at 3 or 12 months	Examples of changes that require more time
– Revised our guideline for VTE prevention to be specific for orthopedic trauma patients with data monitoring after implementation	– Awaiting consensus among anesthesiologists for pain management in acute injury protocol and then submit to hospital committee
– Postoperative mobilization protocol in hip surgery has been implemented	– Delirium prevention strategies implemented—some individuals have not yet adopted
– Geriatricians regularly teach residents about our orthogeriatric concept; ICU awareness still to be optimized	– Software alerts ready for hip fractures and vertebral fractures: need to start using new orthogeriatric clinical record and measure
– We have mini guides for hip fractures, anticoagulation, delirium	– To organize the addition of a clinic for falls prevention and physiotherapy
– Technique for fascial block included in hip fracture guide with step by step and graphics	– Have more access to a geriatrician, especially outside of normal daytime hours

start such a program in the future. At each hospital, 4 or 5 goals and targets for implementation were agreed by completing a structured template for a performance improvement plan: Problem, Plan, Current performance, and Target performance. The presentations section of the event was customized and attended by 20 to 50 team members (orthopedic ward, physicians from the orthopedic, anesthesia, and geriatric departments). Topics selected by a majority of departments were principles of co-managed care (7), preoperative optimization (7), and management of delirium (4). Other topics included were antibiotics, pain, and osteoporosis (Table 2). Follow up was conducted after 3 and 12 months to review the degree of achievement of each planned change and to identify the remaining barriers to complete implementation (Tables 3 and 4).

During each event, feedback was gathered from the local host and team members in order to check that the process of visiting faculty was accepted and to identify any changes for the future. Some of the positive aspects reported were having dedicated time to look at each step of the process and the organization around the patients with both an internal and external view, having all the team involved (motivation boost and help to organize resources), helping to identify good practices in the department (e.g. availability of a geriatrician 7 days a week, availability of all osteosynthesis and prosthesis material 24 hours a day, good teamwork and co-management, and good communication), and providing a way to demonstrate the importance of orthogeriatric work to the rest of the department and medical partners, of good communication and trust between local team and visiting faculty, and of clearly identifying areas for improvement.

Some suggestions for future events were to include representatives from the emergency department (nurses or junior orthopedics) to discuss the preoperative phase, to adjust the presentations for more advanced members of the team, to include a nurse and anesthetist in the visiting faculty, to ensure the visiting faculty has a clearer understanding of local aspects of care (same country of the hospital), to include time in final session for an informal exchange of ideas by the entire team, and to advertise the event better to reach all team members.

Feedback was also gathered from the visiting faculty. They reported the importance of a preparation meeting online with the local hosts and a face-to-face informal meeting with the local team before the event. They found the structured forms for data collection and for the planning session to be very important. For example, the questions in the emergency department "who assesses the patient first?" and "who gets informed about the admission?" There was great value in reviewing 3 cases prepared by the local team to show their normal standard care and to highlight some representative challenges in an open and trusted environment. They stressed the importance of the visiting faculty commenting on all the current good practice ("what is going well?") as well as helping the local team to identify "what could be done differently?" They encouraged making observations and sharing suggestions of approaches that have worked elsewhere for the local team to consider rather than making strong recommendations or questioning any current practices. The feedback from each department was used by the visiting faculty when planning subsequent events at other hospitals.

Table 5. Problems That Were Identified and Solutions Implemented (Summary From All Sites).

Preoperative phase	**Solution**
To identify high risk patients	Implement assessment tools (e.g., Charlson Index, Parker mobility, CAM)
To reduce complexity/inconsistency of care	Develop and apply standard protocols with local subspecialties
To optimize pain management	Implement protocols and guides (avoid contraindicated medications); train staff to use more nerve blocks, then adjust protocol; measure the outcomes before and after changes; implement a pain evaluation, medication, and monitoring program
To facilitate early surgical treatment	Implement a process such as "hip call" (checklist for all steps so everybody knows what to do: on arrival to go through the patient's medicine list and medical history, etc.)
To document at risk patients	Set up an alert system in the electronic record for hip and vertebral fractures
In hospital stay	**Solution**
To ensure scheduling	Have a dedicated orthogeriatric operating room; suggest second slot in operating room daily is allocated for a hip fracture (avoid hip fractures going last on the surgery list)
To improve monitoring (e.g., for fluids, delirium)	Develop checklists for all key topics
To avoid anything might cause restraint	Educate all new team members to avoid tubes, equipment, etc.
To avoid over-personalized prevention plans	Establish anticoagulation and DVT protocols with anesthetists
To avoid delirium	Implement prevention strategies everywhere and educate team
To prevent delirium	Add large clocks, calendars, etc. in emergency areas and main rooms
Postoperative	**Solution**
To reduce complexity of care	Simplify and combine follow-ups (reduce appointments)
Rehabilitation	Consider creating a dedicated geriatric rehabilitation center
To avoid postoperative immobilization	Implement a standard protocol for postoperative mobilization
To monitor patient's skin, etc.	Establish clinic for physiotherapy aftercare and for falls assessment
To support secondary prevention	Develop hospital discharge protocols for calcium, vitamin D, etc.
System or teamwork-related	**Solution**
To provide more structure	Create and implement department-specific protocols and guidelines for all phases
To ensure communication for decisions on inpatients	Hold short daily review meetings
To show the value of the department	Create a communication plan for stakeholders
To ensure communication to family	Make the leader clear (who makes the final decision)
To address education gaps	Create training and education for all groups; use AO Trauma app
To select the appropriate surgical procedure for each fracture type	Ensure implant options and availability
To improve care	Incorporate geriatricians into the team and enhance collaboration with anesthetists
To ensure optimal documentation	Implement electronic records and other clear systems (avoid hand-written notes, etc.)

After the pilot event, feedback was gathered from each hospital visited by different pairs of faculty members (at least 1 geriatrician and 1 surgeon per event). The second visit received positive feedback from the local team who reported that the event had strong institutional support and it helped to identify good practices in the department. The feedback also identified topics to address differently and recommended to build a local consensus for performing nerve blocks for pain management in the emergency department, to add non-hip fractures to the orthogeriatric care protocols, and to improve electronic records.

Follow ups from the hospitals included reports of successful changes related to departmental organization, certification applications, installation of software, and teamwork through the implementation of daily meetings, etc. The detailed outcomes for each department are not reported here because their main value is for the local team and their patients. Some general techniques that were successful are included in Table 5 based on agreed input by the co-authors representing each department visited. Two of the hospitals had a co-managed care program established for many years before the visit. One reported that the visit provided an opportunity to kickstart the development of their updated hip fracture program. It provided an opportunity to examine their entire program and to identify challenges to focus on and provided ideas and solutions to implement for 5 problems. The other department with a well-established program reported that the visit provided an appropriate method for them to identify and prioritize issues and solutions, and has resulted in new educational developments for nursing care, etc. Additionally, they started monthly meetings with the multidisciplinary team and this helped implement an updated anticoagulation management guideline with up-to-

date VTE prophylaxis and successfully established a postoperative mobilization protocol for hip fracture patients, and through multidisciplinary collaboration they are improving delirium care and developing pain-free surgery and a protocol for peripheral nerve blocks.

Another department reported that the interdisciplinary educational day helped them organize their team and distribution of resources, as well as draw up a plan of action and motivate all the team members. After the visit, the hospital was in the revision phase of the International Osteoporosis Foundation's Capture the Fracture map. A dedicated clinical record software was created for orthogeriatrics enabling results to be displayed and helping to perform research. The visit helped the department to identify other areas to develop and they now plan teaching activities for students and to enhance their services to care for the local population.

One department reported that the overall educational visit went well and it was ideal to receive feedback from another point of view, which was very different to a formal certification audit. It was a good and rare opportunity to gather everybody to work on the same goal, making it a team event. Additionally, it provided a way to demonstrate the importance of orthogeriatric work to the rest of the department and medical partners. They identified topics to do differently and planned to build a local consensus for performing nerve blocks for pain management in the emergency department, adding non-hip fractures to their orthogeriatric care protocols, and improving their electronic records.

Discussion and Conclusions

The 1-day Hospital-based Educational Event on Fracture Care for Older Adults was accepted by all hospitals and provided an educational opportunity to all members of the healthcare team. It provided the local team leaders with an opportunity to reflect and to plan together. The costs and organizational requirements for running this format compare favorably with running external face-to-face courses (travel, accommodation, and meals for the visiting faculty along with meeting room facilities are the main costs and depend on the location of the site and faculty). Educationally, the main advantages are that it reaches the entire team (providing interdisciplinary learning) and provides the local team with a review of their daily practices. The main challenges are to select sites where improvements can be achieved, especially in sites where a co-managed care program already exists, and to ensure that the local team are comfortable with having an open discussion with external faculty. Feedback from the reports received from all departments suggests that the educational visit was customized appropriately for their local needs.

This format of event is a new option in the challenging field of education and knowledge transfer.

It also acts as a quality improvement initiative undertaken to ensure improvement in healthcare services and health status of elderly patients. The results and experience of the first events are encouraging and, more than that, they lead to impressive changes in treatment. The problem lists and expectations submitted in the applications show that each department has their own specific and often different challenges. The departmental visits and case reviews confirmed some of these challenges and these were documented in the final list of planned changes from the sites. However, some additional or different gaps were also identified in every department and some of these are also represented in the intended changes.

Some of the hospital visits showed the visiting faculty that potential solutions to challenges may be difficult due to local cultural reasons or regulations (e.g., some hospitals have no access to opiate drugs and alternative medications are needed for first-line pain management, and the specialty of geriatrics is not established in all countries and some departments work with other specialists in internal medicine). These experiences highlight the importance of being able to adapt general orthogeriatric guidelines to local realities and for the visiting faculty to bring a flexible approach to help the local department plan changes that can be successful.

The main limitations of this current study are that it does not provide objective data to prove that the educational intervention improved processes, knowledge, and attitudes, and it lacks data to show specific improvements in patient or system outcomes. Future development could focus on single site research to measure patient outcomes and system parameters before and after the educational event, and on multicenter studies to compare the effects of various improvements to address similar problems.

Comparing our educational event to findings from published literature on interprofessional approaches and quality improvement programs, many of the key areas and outcomes reported in the applications are similar to quality indicators reported by other groups.[26] The effect of a multidisciplinary perioperative care bundle that standardized management in the emergency department, operating theater, and ward has been shown to produce a clinically and statistically significant reduction in the incidence of delirium following hip fracture surgery, and this program included regular education for staff as well as continuous auditing of compliance.[27,28] Postoperative outcomes in patients may also benefit from a multidisciplinary rehabilitation model adapted to the patient with dementia, and by redefining results of rehabilitation for these patients.[29] Systematic reviews have shown that the Fracture Liaison Service (FLS) model of care is associated with significant improvement in rates of bone mineral density testing, initiation of osteoporosis treatment, and adherence with treatment for individuals who sustain fragility fractures.[30] These improvements resulted in significant reductions in refracture risk and lower postfracture mortality. The benefits of interprofessional collaboration have been reported by interviewees after 2 years of orthogeriatrics care, who emphasized in particular the systematic and frequent face-to-face communication enabled by the interprofessional team meeting.[31] They reported that collaboration was challenged by divergent views of the patients by different groups, by the relevance of information given in the weekly meetings, and by heavy workloads; however, good

communication, mutual respect for other professionals, and shared goals enhanced interprofessional collaboration and improved the sense of having a shared mission.[31]

Future developments of our program include repeating the event in additional hospitals, especially in more departments that do not have any existing co-managed care or geriatric fracture program, and in different regions of the world. It would also be worthwhile to investigate the effect of 1-day events to support initiatives to improve outcomes and efficiency in many countries using structured protocols and outcome measures.[32-36] The taskforce will examine the creation of a process and kit for self-implementation by a more local team; however, the involvement of the visiting faculty was such an important component that it would be difficult to run this specific program alone in a department. We will also explore if the program meets requirements for continuing education credits and quality improvement program grants, etc. and what resources or meetings with remote faculty might be achievable online. In a postscript to the pilot event, the local clinicians have since published 2 articles on topics they discussed; namely, "hip call" to facilitate early management of fractures and predictors of acute kidney injury after a hip fracture.[37,38]

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