

HIP FRACTURE SURGERY IN NOVA SCOTIA: A COMPARISON OF TREATMENT PROVIDED BY “GENERALIST” GENERAL SURGEONS AND ORTHOPEDIC SURGEONS

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OBJECTIVE: To determine quality of hip fracture services provided by “generalist” general surgeons (generalists) in Nova Scotia.

DESIGN: Chart review and postoperative, blinded, random-ordered radiologic analysis.

SETTING: Three community hospitals and 1 tertiary care hospital in Nova Scotia.

PARTICIPANTS: Seven generalists who performed 120 hip fracture repairs and 7 orthopedic surgeons (specialists) who performed 135 hip fracture repairs.

OUTCOME MEASURES: Patient demographics, preoperative, perioperative, postoperative and discharge information, technical quality of reduction as determined through postoperative radiologic assessment.

RESULTS: There were no differences between patients treated by generalists and those treated by specialists with respect to age, sex, American Society of Anesthesiologists' class, level of function and fracture type. Intraoperatively, the patient groups were similar with respect to type of anesthesia, use of antibiotics, number of transfusions and surgical complications. Significant differences were noted in length of operation (54.4 v. 41.1 minutes), use of C-arm imaging (6.7% v. 85.9%) and management of Garden classes 1 and 2 subcapital fractures. Postoperatively, the 2 groups had similar numbers of medical complications, wound complications, reoperations, readmissions and deaths, and a similar level of function on discharge. Significant differences included the number of intensive care unit admissions (5.8% v. 15.6%) and length of stay there (5.7 v. 2.8 days) and of postoperative stay (14.5 v. 10.7 days). The assessment of radiographs did not demonstrate any significant difference in the quality of reduction.

CONCLUSION: In Nova Scotia the outcomes of hip fracture surgery performed by generalists are comparable to those performed by specialists.

OBJECTIF : Déterminer la qualité des services de réduction des fractures de la hanche fournis par des chirurgiens généraux «généralistes» en Nouvelle-Écosse.

CONCEPTION : Examen de dossiers et analyse radiologique aléatoire, à l'insu et postopératoire.

CONTEXTE : Trois hôpitaux communautaires et un hôpital de soins tertiaires en Nouvelle-Écosse.

PARTICIPANTS : Sept généralistes qui ont réduit 120 fractures de la hanche et sept chirurgiens orthopédiques (spécialistes) qui en ont réduit 135.

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MESURES DES RÉSULTATS : Aspects démographiques des patients, renseignements préopératoires, périopératoires, postopératoires et à la libération, qualité technique de la réduction déterminée par une évaluation radiologique postopératoire.

RÉSULTATS : On n'a pas constaté de différence entre les patients traités par des généralistes et ceux qui ont été traités par des spécialistes pour ce qui est de l'âge, du sexe, de la catégorie de l'American Society of Anesthesiologists, du niveau de fonctionnement et du type de fracture. Pendant l'intervention, les groupes de patients étaient semblables en ce qui concerne le type d'anesthésie, l'utilisation d'antibiotiques, le nombre de transfusions et les complications chirurgicales. On a constaté des différences importantes quant à la durée de l'intervention (54,4 c. 41,1 minutes), l'utilisation de l'ampliphotographie sur arceau (6,7 % c. 85,9 %) et le traitement des fractures sous-capitales des catégories 1 et 2 de Garden. Après l'intervention, les deux groupes ont connu autant de complications médicales, de complications liées à la plaie, de nouvelles interventions, de réadmissions et de décès, ainsi qu'un niveau de fonctionnement semblable à la libération. Les différences importantes incluent le nombre d'admissions aux soins intensifs (5,8 % c. 15,6 %), la durée du séjour aux soins intensifs (5,7 c. 2,8 jours) et du séjour postopératoire (14,5 c. 10,7 jours). L'évaluation des radiographies n'a pas révélé de différence importante quant à la qualité de la réduction.

CONCLUSION : En Nouvelle-Écosse, les résultats des réductions chirurgicales de fractures de la hanche effectuées par des généralistes se comparent à ceux des interventions pratiquées par des spécialistes.

Since the release of the Barer–Stoddart report in 1991,¹ issues of physician resource management have maintained a prominent place in the rural health care debate.² In particular, the Barer–Stoddart report called attention to the long-standing discussion within general surgery about the role of the traditional “generalist” general surgeon,³⁻⁹ by recommending that priority be given to training “generalist” specialists for nonurban hospital based practice. This recommendation is based on the understanding that the primary specialty care needs of rural Canadians are not necessarily well served by the urban, academic, tertiary care model.¹⁰ Despite modern day transportation, Canada’s rural population is widely dispersed across a large geographic area that makes access to urban centres often difficult and sometimes impossible, especially in urgent situations. Alternatively, rural practice for highly specialized physicians is generally unattractive. The rigours of uninterrupted availability, poor remuneration and a general lack of technical resources preclude many specialists from entertaining the possibility of rural practice.¹¹ Consequently, “generalist” general surgeons, who provide primary surgical services for the more common surgical problems without

respect to specialty divisions, provide a practical solution to rural surgical manpower needs.

This recommendation has been criticized by the surgical subspecialty community, which feels that surgical “generalism” is an archaic ideal that depreciates the present high standard of surgical care provided in Canada.¹² During the 20th century, the medical profession has viewed increasing specialization as an important means of improving the standard of health care¹³⁻¹⁵ and, given that the majority of surgical subspecialists have been exposed to the mishaps of lesser skilled practitioners working outside their area of expertise, it is not surprising that the concept of surgical “generalism” is viewed with a jaundiced eye.

The physician resource discussion is not new to general surgery. Previous reports have focused on the increasing age of Canadian general surgeons, their undersupply and changes in general surgical practice.¹⁶⁻¹⁹ More recently, several studies have examined specifically the issue of surgical generalism with respect to the role of “generalist” general surgeons, the optimal means of training them, the medicolegal aspects of surgical generalist practice and, finally, the incentives that might attract residents to this career

option.²⁰⁻²³ Nonetheless, to date there have been no outcome studies to determine the quality of subspecialty care provided by these surgeons.

In Nova Scotia “generalist” general surgeons play a prominent role in providing subspecialty services within both community and regional hospital settings. Consequently, we undertook to examine outcomes after hip fracture surgery in Nova Scotia comparing “generalist” general surgeons (generalists) with “specialist” orthopedic surgeons (specialists), whose outcomes served as the standard.

PATIENTS AND METHODS

Between Apr. 1, 1994, and June 1, 1994, we analysed 120 hip fracture procedures performed by 7 generalists. These surgeons ranged in age from 35 to 63 years and had completed 3 to 6 months of orthopedics in their respective residency training programs. They practised in 3 community/regional hospital settings, which served populations of approximately 25 000. Beginning with patients admitted on or before Dec. 31, 1993, we worked backwards, examining charts and radiographs until 40 charts were reviewed from each of the 3 hospitals. This represented a 15-month period for 2 hospitals and a 3-year period for 1 hospi-

tal. We compared these results with those of 135 hip fracture procedures performed by 7 specialists practising in an academic tertiary care centre. To have comparable patient populations, we examined the charts of all patients coded as "hip pinning" (i.e., Association for Osteosynthesis [AO] or dynamic hip screw [DHS] pinning) in the 6-month period between July 1, 1993, and Dec. 31, 1993, and all patients coded as "Moore hemiarthroplasty" in the 1-year period between Jan. 1, 1993, and Dec. 31, 1993. We did not identify any patients managed nonoperatively during this period in either treatment group.

For each patient we collected the following: demographic information; preoperative information (i.e., level of function, level of health, type of fracture); perioperative information (type of anesthesia, type and length of repair, transfusion requirements); postoperative information (intensive care unit requirements, medical com-

plications, medical consultations, local complications, reoperations, deaths); and discharge information (level of function, discharge location, readmission). Finally, a musculoskeletal radiologist performed a random-ordered, blinded analysis of the patients' preoperative (if available) and immediate postoperative x-ray films for both hip pinning and hemiarthroplasty procedures to determine the technical quality of repair. The repair was categorized as optimal if it was technically perfect, suboptimal if it was technically imperfect but clinically acceptable or inadequate if it was technically unacceptable. These categories were based upon previously established guidelines relating postoperative radiologic evaluation to outcome.²⁴⁻²⁶ The reasons for being categorized as suboptimal and inadequate were also collected.

The data were collated using the Epi Info 5.0 statistical program²⁷ and

analysed by appropriate univariate analysis, χ^2 analysis or the unpaired *t*-test.

RESULTS

The demographic and preoperative data are summarized in Table I. There were no significant differences between the 2 groups with respect to age, sex, level of health and pre-morbid illness as defined by American Society of Anesthesiologists (ASA) score, and level of function. The types of fractures and their subclassifications are noted in Table II. Generally, the preoperative radiology report did not refer to the specific fracture subclassification (i.e., Garden classification²⁸). This information was therefore derived from preoperative radiographs interpreted by the musculoskeletal radiologist and is incomplete, especially in the specialist treatment group, which consisted of many patients transferred for care. In general, preop-

Table I

Demographic, Preoperative Data on Patients Managed by 7 "Generalist" General Surgeons (Generalists) and 7 Orthopedic Surgeons (Specialists)

Data	Group	
	Generalists	Specialists
No. of patients	120	135
Mean age, yr	81	80
Sex, male/female	30/90	37/98
ASA class, no. (%) of patients		
I	8 (6.7)	7 (5.2)
II	55 (45.8)	76 (56.3)
III	54 (45.0)	49 (36.3)
IV	3 (2.5)	3 (2.2)
Level of ambulatory function, no/total no. (%) of patients*		
Independent	63/118 (53.4)	72/131 (55.0)
Assisted	44/118 (37.3)	51/131 (38.9)
Wheelchair	11/118 (9.3)	8/131 (6.1)

ASA = American Society of Anesthesiologists

*Level of ambulatory function was not noted on the charts of 2 patients in the generalist group and 4 patients in the specialist group.

Table II

Type of Fracture in the 2 Groups of Patients Treated by Generalists (120 Patients) and Specialists (135 Patients)*

Type of fracture	Group, no. (%) of patients	
	Generalists	Specialists
Subcapital (Garden classification)	67 (55.8)	77 (57.0)
Class 1	12	8
Class 2	1	1
Class 3	25	20
Class 4	18	16
Intertrochanteric	50 (41.7)	57 (42.2)
Undisplaced	33	18
Displaced	17	6
Subtrochanteric	2 (1.7)	1 (0.7)
Greater trochanteric	1 (0.8)	0

*Some information in this table is incomplete because it was obtained from preoperative radiographs interpreted by the musculoskeletal radiologists. In some cases the radiographs were returned to the local hospitals.

erative films originate from the patient's local hospital and are returned there after the patient is discharged.

With respect to the perioperative outcome data (Table III), no differences were noted in the type of anesthesia, the use of antibiotics and the number patients who received blood

transfusions intraoperatively. Significant differences were noted in the availability of C-arm imaging technology, the length of procedures, and the management of Garden class 1 and 2 subcapital fractures ($p < 0.05$). The difference in length of procedure associated with hip pinning procedures was

likely secondary to the lack of C-arm availability. Generalists treated at least 13 patients with Garden class 1 and 2 subcapital fractures with a Moore prosthesis, whereas specialists treated similar patients with AO pinning.

The postoperative outcome data are given in Table IV. Both groups had similar numbers of medical consultations, medical complications, wound complications, reoperations, readmissions and deaths. Significant differences were noted in the number of patients requiring ICU admission, the length of ICU stay and the overall length of stay ($p < 0.05$). The difference in the number of ICU admissions suggests either different patient populations or different philosophies concerning ICU bed use. The latter seems to be the likely explanation since many patients in the tertiary care setting appear to have been placed in the ICU setting for monitoring purposes. This view is supported by their short length of stay compared with patients in the community/regional hospital setting.

No difference was noted in level of function upon discharge (Table V). However, patients treated in the tertiary care hospital tended to be transferred back to local community hospitals for continued convalescence (Table VI), which might account for the difference in length of stay noted between the 2 groups.

Table III

Perioperative Data on Patients Managed by Generalists (120 Patients) and Specialists (135 Patients)

Data	Group		p value
	Generalists	Specialists	
Anesthesia, spinal/general, no. of patients	46/74	55/80	NS
C-arm access, no. (%) of patients	8 (6.7)	116 (85.9)	< 0.05
Transfusion, no. of patients	8	12	NS
Mean length of procedure, min	54.4	41.1	< 0.05
Moore prosthesis	44.8	42.8	NS
Hip pinning	65.1	40.1	< 0.05
Type of repair, no. (%) of patients			
Moore prosthesis	64 (53.3)	49 (36.2)	—
AO pinning	1 (0.8)	24 (17.8)	—
DHS pinning	45 (37.5)	62 (45.9)	—
McGlaughlin nail plate	10 (8.3)	0	—

*At least 13 patients had Garden classes 1 and 2 subcapital fractures. All patients received antibiotic therapy. AO = Association for Osteosynthesis, DHS = dynamic hip screw, NS = not significant

Table IV

Postoperative Data for Patients Managed by Generalists (120 Patients) and Specialists (135 Patients)

Data	Group		p value
	Generalists	Specialists	
Intensive care unit			
Admissions, no. (elective)	7 (5.8)	21 (15.6)	< 0.05
Complications, no.	7	11	NS
Length of stay, d	5.7	2.8	< 0.05
Medical consultations, no.	14	24	NS
Medical complications, no.	84	78	NS
Wound complications, no.	8	4	NS
Reoperations, no.	5	45	NS
Length of hospital stay, d	15.5	11.9	< 0.05
Deaths, no.	5	5	NS
Readmissions, no.	5	3	NS

Table V

Level of Ambulatory Function at the Time of Discharge of Patients Managed by Generalists (114 Patients) and Specialists (129 Patients)*

Functional level	Group, no. (%) of patients	
	Generalists	Specialists
Independent	0	0
Assisted	79 (69.3)	85 (65.9)
Wheelchair	35 (30.7)	44 (34.1)

*This information was not available for 1 patient in each group, and 5 patients in each group died.

The results of the radiologic analysis are summarized in Table VII. The data do not suggest a difference between the 2 groups with respect to the technical quality of repair. The specific reasons for suboptimal and inadequate repair are listed in Table VIII.

DISCUSSION

Our data suggest that generalists are comparable to specialists in the provision of hip fracture services in Nova Scotia. The short-term outcomes of patients cared for by these surgeons did not differ with respect to postoperative morbidity, reoperation and death rates, level of function at the time of discharge or readmission rate. In addition, despite variation in some treatment choices, no deficiencies were noted in the technical abili-

ties of these surgeons when performing hip fracture surgery. We feel this study addresses important issues specific to the various task force recommendations and the recent decision of the Royal College of Physicians and Surgeons of Canada to encourage general surgical programs that tailor training for residents intent upon pursuing a “generalist” general surgery career.

This study has certain limitations. First, it is a retrospective analysis; therefore we relied on nonstandardized information derived from admission records, anesthesia and operating room records, operating room reports, nurses’ and physiotherapists’ notes, and physicians’ orders and progress notes. Second, the use of a musculoskeletal radiologist to assess the quality of technical repair has limi-

tations. We chose a musculoskeletal radiologist over an orthopedic surgeon in an effort to exclude bias from the outcome assessment. Certainly, the expertise of the radiologist to interpret films is not questioned; however, his or her ability to appreciate technical nuances, which might be applied in performing the procedure, may not be appreciated. Finally, this study is limited by our inability to assess long-term follow-up information from office chart records. Operations for hip fracture — especially implantation of Moore prostheses — have a well-described morbidity associated with chronic hip pain and acetabular degeneration.²⁹⁻³¹ This potential morbidity could have been identified by access to office chart records. Nonetheless, this weakness is tempered by the fact that hip fracture

Table VI

Discharge Location for Patients Managed by Generalists (115 Patients) and Specialists (130 Patients)*

Location	Group, no. (%) of patients	
	Generalists	Specialists
Home	46 (40.0)	28 (21.5)
Nursing home	33 (28.7)	30 (23.1)
Rehabilitation hospital	31 (27.0)	20 (15.4)
Community hospital	5 (4.3)	52 (40.0)

*5 patients in each group died.

Table VII

Radiologic Analysis of the Technical Quality of Hip Repair in Patients Managed by Generalists (105 Patients) and Specialists (129 Patients)*

Quality of repair	Group, no. (%) of patients	
	Generalists	Specialists
Optimal	75 (70.8)	81 (62.8)
Suboptimal	26 (24.5)	45 (34.9)
Inadequate	4 (3.8)	3 (2.3)

*Analysis was not available for 15 patients in the generalist group and 6 patients in the specialist group.

Table VIII

Reasons for Suboptimal and Inadequate Repairs in Patients Managed by Generalists (30 Patients) and Specialists (48 Patients)

Reasons	Group, no.	
	Generalists	Specialists
Suboptimal repair	26	45
Medial displacement	1	0
Lateral displacement	0	2
Anterior displacement	4	4
Posterior displacement	0	3
Impaction	1	7
Pins not parallel	0	14
Bent cortical screw	1	0
Proximal femoral fracture	9	8
Valgus deformity	2	5
Varus deformity	2	2
Poorly seated prosthesis	4	0
Greater trochanteric fracture	1	0
Subluxation of femoral head	1	0
Inadequate repair	4	3
Prosthesis into cortex	2	1
Prosthetic stem through cortex	1	1
Threads not crossing fracture site	1	1

surgery in the elderly is often palliative and these patients have a significant 1-year death rate.

Despite these limitations, our data have currency in the present debate regarding the provision of services to rural areas. The fact that at least 19% of patients treated by generalists underwent different procedures than they would have had they been treated at the tertiary care centre highlights 2 major practice issues. First, generalists treated Garden 1 and 2 subcapital fractures with a Moore prosthesis instead of the standard AO pinning procedure performed in the tertiary care setting, primarily because C-arm technology was not available and is required to perform the AO pinning procedure expediently. In our discussions with surgeons in the community, AO pinning with the help of standard radiographs was thought to be impractical because of the number of screws to be placed and radiographs required. Functionally, this treatment decision may appear rational, but it represents a more radical procedure with an increased potential for long-term complications. More importantly, it deviates dramatically from the accepted standard of practice for this fracture pattern. Second, 1 generalist utilized the older McGlaughlin nail plate for 10 intertrochanteric fracture repairs. This hardware combination is mechanically weaker and is associated with a higher failure rate in unstable fractures.^{32,33} The DHS is now the preferred implant. Thus, although the technical quality of fracture repair did not differ between this generalist and the others in the short term, this generalist practice was at variance with the tertiary care standard. The interpretation of these practice differences lies at the heart of the "generalist" general surgery debate. One might interpret them to be completely unacceptable and conclude

that only certified orthopedic surgeons should perform orthopedic procedures in any setting. Alternatively, one might suggest that these differences are minor, could easily be rectified and did not adversely affect patient outcome in the short and medium term.

At present the future of surgical generalism is uncertain. Despite the Royal College's support for training "generalist" general surgeons, it is unclear whether there will be enough surgeons to replace those near retirement.²³ More importantly, as many provinces regionalize their health care systems in an effort to streamline health care delivery, the role of the "generalist" general surgeon will become even more contentious. Ultimately, the future of "generalist" general surgical practice may rest upon provincial policy decisions to support this type of practice within smaller regional hospitals and more remote community hospitals.

CONCLUSIONS

The outcomes in patients who undergo hip surgery performed by "generalist" general surgeons in Nova Scotia appear to be comparable to those of "specialist" orthopedic surgeons with respect to patient management and technical skills. However, the study highlights important variations from standard practice, which raise some concerns. The province and hospital should provide adequate technical support (i.e., C-arm technology) to enable these surgeons to meet standard practice patterns if hip fracture services are to be maintained within these settings. Moreover, there should be continuing medical education and quality assurance mechanisms to ensure that "generalist" general surgeons adapt to changing treatment.

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