

Malignant Pathologic Hip Fracture in Ontario: A Population-Based Cohort Study of Incidence and Management

TP Hanna^{1,2}, W Kong¹, J Zhang-Salomons¹, JF Rudan³, WJ Mackillop^{1,2}



¹Queen's Cancer Research Institute, Kingston ON, Canada ². Cancer Center of Southeastern Ontario, Kingston, ON, Canada ³ Division of Orthopaedic Surgery, Kingston General Hospital, Kingston, ON, Canada

Rationale

Malignant pathologic hip fracture (MPHF) is a cause of significant morbidity for patients with advanced cancer (1,2). There is almost no data describing its incidence, management or expected survival in the general population.

Objectives

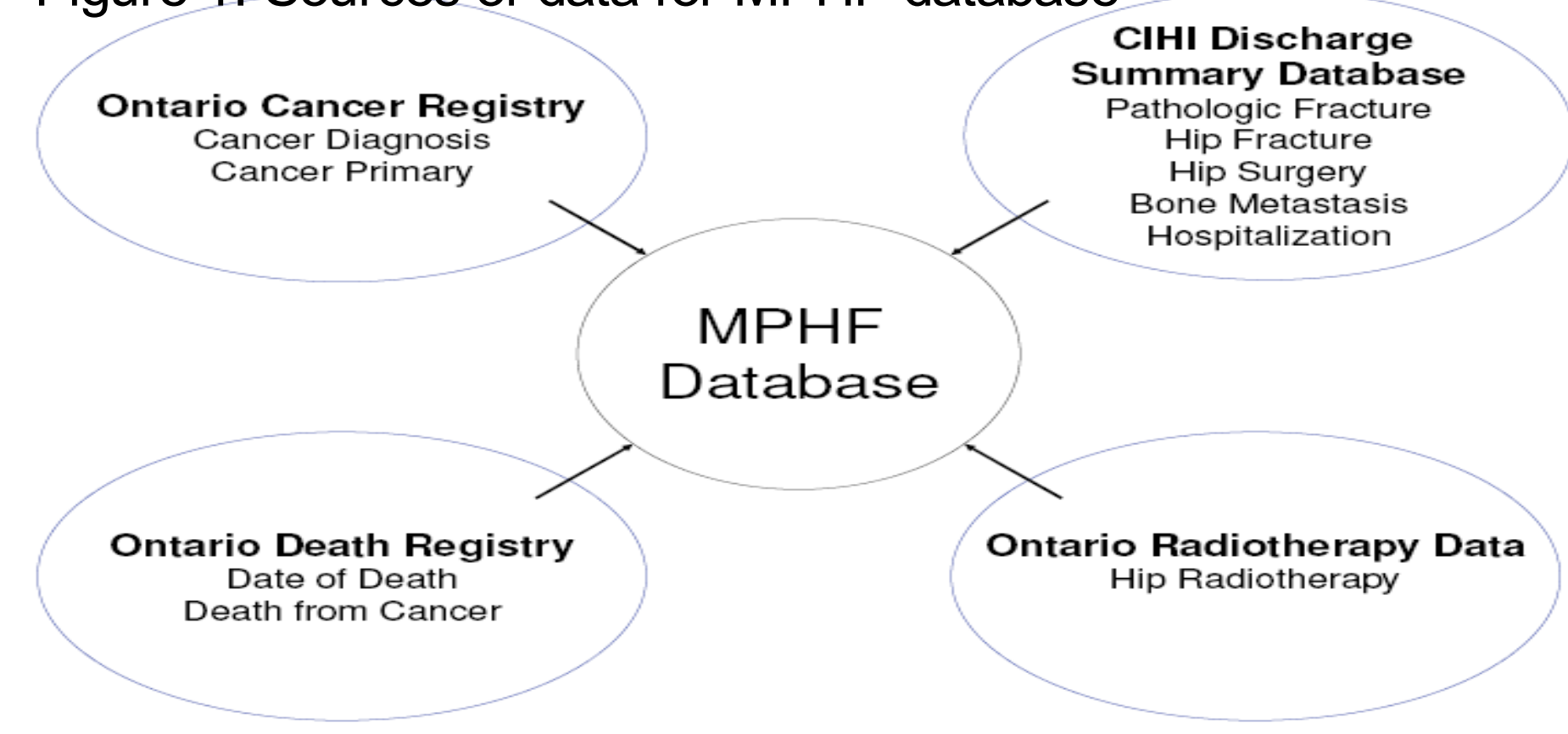
To estimate the incidence of malignant pathologic hip fracture and describe the management of MPHF with post-operative radiotherapy among patients dying of cancer in the Canadian province of Ontario. To identify factors associated with utilization of post-operative radiotherapy for MPHF.

Methods

Design: Retrospective, population-based, cohort study using administrative data linked to Ontario's population-based cancer registry (OCR).

Information about fractures, surgical procedures, and time spent in hospital, derived from hospital separation records, was provided by the Canadian Institute for Health Information for 1992-2001. Radiotherapy (RT) records were provided by all provincial RT centres. We developed and validated algorithms to identify pathologic hip fractures based on the available information. Factors associated with the utilization of post-operative radiotherapy were identified using logistic regression.

Figure 1: Sources of data for MPHF database



Operational Definition of MPHF

- Pathologic fracture and hip surgery within one month. OR
- Pathologic fracture and hip fracture within one month. OR
- Pathologic fracture and hip radiotherapy within two months OR
- Documented bone metastasis and hip fracture

Population Characteristics

- 217,159 patients dying of cancer in Ontario 1992-2001
- 3,559 of these patients with ≥1 episode of MPHF
- Median age 69 years
- 58.8% female

Incidence

Primary	Cumulative Incidence in the last 5 years of Life
Myeloma	12.76 (10.90, 14.63)
Breast	6.86 (6.46, 7.27)
Kidney	6.67 (5.66, 7.68)
Thyroid	6.60 (4.15, 9.06)
Prostate	4.49 (4.10, 4.89)
NSCL	2.92 (2.58, 3.26)
Unknown	1.83 (1.22, 2.44)
SCLC	1.82 (1.03, 2.60)
Lymphoma	1.62 (1.21, 2.02)
Melanoma	1.57 (1.01, 2.13)
Uterus	1.51 (0.96, 2.07)
Bladder	1.21 (0.89, 1.53)
Cervix	1.06 (0.51, 1.62)
Colorectum	0.72 (0.57, 0.88)
Head & Neck	0.68 (0.41, 0.95)
Nasopharynx	0.61 (0.00, 1.44)
Leukemia	0.46 (0.24, 0.69)
Pancreas	0.37 (0.15, 0.58)
Ovary	0.31 (0.10, 0.53)
Primary Brain	0.14 (0.0, 0.30)

All Sites 3.03 (2.92, 3.15)

Most Common Causes

- Breast cancer (32%)
- Lung cancer (20%)
- Prostate cancer (15%)
- Myeloma (7%)
- Kidney (5%)

Management

- Hip Surgery: 64%
- Post-operative RT: 21.3%
- No Surgery or RT: 26.1%
- Median time from surgery to radiation** 17 days (range 1 to 30)
- Most common RT regimens**
- 20 Gy in 5 (41.6%)
- 8 Gy in 1 (32.6%)
- 10 Gy in 1 (4.4%)
- 30 Gy in 10 (3.3%)

Factors Associated with Utilization of Post-op RT: Univariate and Multivariate Analysis

	% With Post-op RT	OR (95%CI)
Age		
< 55	24.6%	1.2 (0.9, 1.6)
55-64	22.8%	1.1 (0.8, 1.4)
65-74	21.4%	1.0
75-84	14.5%	0.7 (0.5, 0.9)
≥ 85	11.8%	0.5 (0.3, 0.8)
Fracture diagnosed at hospital with radiotherapy center		
Y	28.7%	2.5 (2.0, 3.2)
N	14.1%	1.0
Time from fracture to death (months)		
< 1	7.0%	0.3 (0.2, 0.4)
1-3	23.4%	1.0
3-6	24.1%	1.1 (0.8, 1.5)
6-12	20.6%	0.9 (0.7, 1.3)
≥ 12	18.0%	0.7 (0.5, 1.0)
Previous RT to hip/pelvis		
Y	13.5%	0.4 (0.3, 0.5)
N	21.6%	1.0
Cancer primary		
Breast	21.5%	1.0
Kidney	25.6%	1.2 (0.7, 1.8)
Lung	21.7%	1.0 (0.7, 1.3)
Myeloma	23.2%	1.0 (0.6, 1.5)
Other	16.4%	0.7 (0.5, 0.9)
Prostate	13.7%	0.7 (0.5, 1.0)

All Variables were significant in multivariate analysis at the p<0.01 level except cancer primary

Conclusions

The cumulative probability of pathologic hip fracture in the final five years of life was 3.0% among patients dying of cancer in Ontario. There is a more than 40-fold variation in incidence between cancer primaries.

The majority of patients have surgery but few receive post-operative radiotherapy (PORT). We identified 4 factors independently associated with utilization of PORT:

1. Most notably patients initially managed at a hospital with an RT centre was more than 2.5 times more likely to receive PORT
-This may reflect referring doctor's beliefs on the utility and efficacy of PORT. It may also reflect patient's wishes. Those living further from a cancer centre may not wish to travel long distances for more treatment.
2. Lower use of PORT with age.
-This is more than would be expected based on a decline in functional status with age (3).
3. Lower utilization rates among patients with life expectancy <1 month.
-This may reflect life expectancy influencing treatment choice or post-operative mortality
4. Lower utilization rates among those with past hip or pelvis radiotherapy

Future Directions

- Validation of data including chart review
- Potential survey of orthopaedic surgeon's opinions on PORT for MPHF
- ? RCT

Reference

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