The Risk of Second Malignancies after Seed Migration in Prostate Cancer Patients Treated With I-125 Free Seeds Brachytherapy

E. Vigneault[1,2], K. Martell[3], D. Taussky[4], S M. Husain[3], G. Delouya[4], K. Mbodji[1], J. Piotte[3], S. Magnan[5], P. Despres[2,5], M. C. Lavallee[2], S. Aubin[2], L. Beaulieu[2,5], W. Foster[2], and A.G. Martin[1,2]

[1]Cancer Research Centre, Laval University, Quebec, QC, Canada, [2]Radiation Oncology, CHU de Quebec, Quebec, QC, Canada, [3]Tom Baker Cancer Centre, University of Calgary, Calgary, AB, Canada, [4]University of Montreal, CHU de Montréal, Montreal, QC, Canada, [5]Laval University, Quebec, QC, Canada

This study was supported by a CARO Sanofi Awards

CARO - SANOFI Award

INTRODUCTION/OBJECTIVES

- Recent studies suggest a possible relation between seed migration after I-125 brachytherapy and second malignancies (SM) occurrence, especially in lung [1,2].
- This retrospective multicentre study was carried out to investigate if seed migration after I-125 brachytherapy is associated with an increased risk of developing SM.

MATERIALS/METHODS

- Between 1994 and 2011, 2802 prostate cancer patients were treated with the same Iode-125 free seeds technique in three Canadian centres: CHU de Quebec, CHU de Montreal and Cross Cancer Centre, University of Calgary
- All patients underwent pelvic radiography and a CT scan to localize the seeds implanted and to evaluate the post implant dosimetry (usually 30 days after the procedure)
- Seeds were considered as having migrated when the number of seeds visualized radiographically in the prostate was inferior to the total number of implanted seeds
- The charts of the patients were reviewed to identify patients who experienced second malignancies, death or death related to SM
- Univariate and multivariate logistic and Cox proportional hazards regression models were performed to assess the predictor factors of SM or death

RESULTS

Table 1: Patient's characteristics

Patient characteristics	Total (n=2802)	Seeds migration no (n=2539)	Seeds migration yes (n=263)	*p*
Age (years)				
Mean (SD)	63.5 (6.9)	63.5 (6.9)	63.2 (6.7)	0.437
Follow-up (months)				
Median (range)	74 (12-246)	74 (12-246)	75 (15-147)	0.632
Hormones (ADT)				
no	2236 (79.8%)	2007 (79.0%)	229 (87.1%)	0.002
yes	566 (20.2%)	532 (21.0%)	34 (12.9%)	
Second malignancies				
no	2699 (96.3%)	2447 (96.4%)	252 (95.8%)	0.730
yes	103 (3.7%)	92 (3.6%)	11 (4.2%)	
Number of seeds implanted				
Mean (SD)	58.6 (13.4)	58.4 (13.4)	60.4 (13.4)	0.026
Median (range)	57 (21-101)	57 (21-101)	60 (26-96)	
Proportion of seed migrated (%)				
Mean (SD)			2.53 (1.4)	
Median (range)			2 (1.04-10.6)	

Table 2: Logistic regression for risk factors of second malignancies

	Univariate			Multivariate		
	OR	CI95%	*p*	OR	CI95%	*p*
Seeds migration						
no	1			1		
yes	1.161	0.613-2.199	0.647	1.176	0.620-2.232	0.619
Age	1.058	1.026-1.090	**<0.001**	1.057	1.026-1.090	**<0.001**
ADT						
no	1			-		
yes	0.774	0.456-1.313	0.342	-		
Number of seeds implanted	1.012	0.998-1.026	0.102	-		

Table 3: Cox regression for risk factors of death

	univariate			multivariate		
	HR	CI95%	*p*	HR	CI95%	*p*
Seeds migration						
no	1			1		
yes	0.849	0.502-1.437	0.542	1.031	0.608-1.750	0.909
Second malignancies						
no	1			1		
yes	4.808	3.524-6.560	**<0.001**	3.706	2.702-5.083	**<0.001**
Age	1.112	1.090-1.135	**<0.001**	1.102	1.080-1.124	**<0.001**
ADT						
no	1			-		
yes	0.859	0.650-1.135	0.286	-		

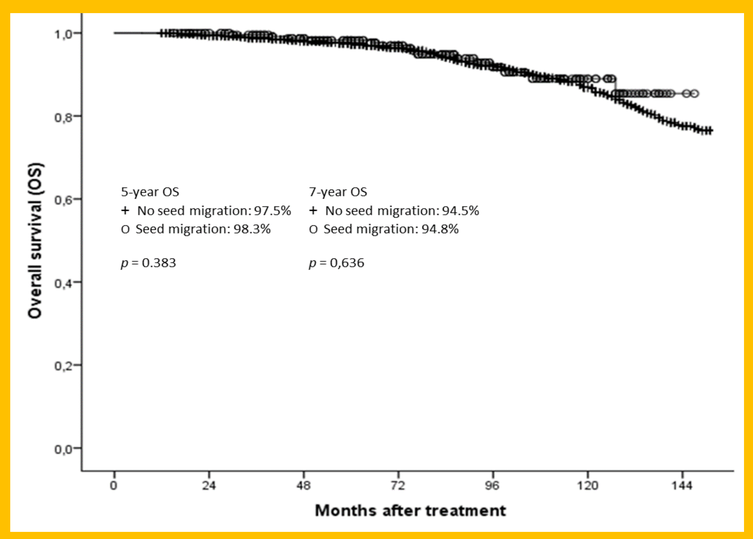

Figure 1: 5-, 7-year OS by seed migration status

Table 4: Second malignancies observed in the cohort

	No seeds migration		Seeds migration	
Second malignancies	N	%	N	%
Glioblastoma	3	0,12	0	0,00
Thyroid	1	0,04	0	0,00
ORL	6	0,24	1	0,04
Lung	15	0,59	0	0,00
Gastrointestinal	22	0,87	3	0,12
Genitourinary	11	0,43	0	0,00
Hematologic	6	0,24	2	0,08
Skin	19	0,75	2	0,08
Sarcoma	0	0,00	1	0,04
Unknown	9	0,35	2	0,08

CONCLUSIONS

- These results do not support an increased risk of second malignancies, particularly lung cancer with seed migration after I-125 free seeds brachytherapy for prostate cancer patients
- Age is the most important risk factor for second malignancies
- Longer follow-up are required to better correlate seed migration and second malignancies

1. Nag S, Vivekanandam S, Martinez-Monge R. Pulmonary embolization of permanently implanted radioactive palladium-103 seeds for carcinoma of the prostate. Int J Radiat Oncol Biol Phys 1997;39(3):667-70.
2. Musunuru H, Mason M, Murray L, Al-Qaisieh B, Bownes P, Smith J, et al. Second primary cancers occurring after I-125 brachytherapy as monotherapy for early prostate cancer. Clin Oncol (R Coll Radiol) 2014;26(4):210-5.