



Short communication

Use of fertility preservation services in male reproductive-aged cancer patients

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ABSTRACT

While fertility preservation is a major concern among reproductive age cancer patients, little is known about access and use of fertility preserving services. We examined use of fertility preserving services among men with common solid tumors.

A total of 3648 men age 18–40 including 2610 (71.6%) with testicular cancer, 939 (25.7%) with colorectal and 99 (2.7%) with prostate cancer were identified. Fertility preservation services were utilized in 9.3% of men overall including 4.1% who underwent fertility evaluation only and 7.8% who had a fertility preservation procedure. The rate of fertility preservation services rose from 6.6% (95%CI, 3.2–10.0) in 2008 to 12.4% (95%CI, 7.3–17.5) in 2017 ($P = 0.04$).

Use of fertility preservation service was more common in patients with testicular (11.6%, aRR = 3.31; 95% CI 2.22–4.92) and prostate cancer (6.1%, aRR = 3.14; 95% CI 1.28–7.70) compared to those with colon cancer (3.4%). Younger men were more likely to utilize fertility preservation services. 11.5% of men age ≤ 35 years vs. 5.2% of men 36–40 used these services ($P < 0.0001$). Fertility preservation services were used in 10.8% of those who received chemotherapy (aRR = 1.81; 95% CI, 1.45–2.27) and in 8.1% of those who received radiation (aRR = 1.30 95% CI, 0.98–1.73). Medicaid patients were less likely to receive fertility preservation services than those with commercial insurance (0.7% vs. 10.1%; aRR = 11.58, 95%CI 2.10–63.69). These data indicate that while use of fertility preserving services is increasing, overall use of services is low among reproductive age males with cancer.

1. Introduction

Advances in cancer treatment for reproductive-aged males have resulted in greater life expectancies and long term survival (Barak, 2019). As survival improves for young adults, the desire for paternity has become an increasingly important issue (Green et al., 2010). The use of sperm cryopreservation prior to cancer treatment is a safe and effective method for male fertility preservation with success rates approaching 90% (Menon et al., 2009). While guidelines for oncologists recommend consideration of fertility preserving options for reproductive age male cancer patients, little is known about the utilization of

these services (Oktay et al., 2018). We analyzed the use and predictors of fertility preservation services among reproductive-aged male cancer patients.

2. Methods

We used the IBM Watson MarketScan database which annually captures claims from >50 million privately insured patients nationwide and 6 million Medicaid enrollees from 12 states (MarketScan Research Database). Data were de-identified and deemed exempt by the Columbia University Institutional Review Board.

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We identified men 18–40 years of age with incident testicular, prostate, or colorectal cancer who underwent cancer-directed surgery from 2008 to 2017. Use of fertility preservation services were classified using available billing codes including evaluation and counseling for fertility preservation as well as fertility preservation procedures including sperm cryopreservation/storage. Covariates in the analysis included age, type of cancer, year of surgery, insurance status, region of residence, Elixhauser co-morbidity index, metropolitan statistical area (MSA), and use of radiation or chemotherapy within 6 months of surgery. Associations between fertility preservation services and the covariates of interest were analyzed using χ^2 tests and multivariable log-linear regression models.

3. Results

We identified a total of 3648 men including 2610 (71.6%) with testicular cancer, 939 (25.7%) with colorectal and 99 (2.7%) with prostate cancer (Table 1). Fertility preservation services were utilized in 9.3% of men overall including 4.1% who underwent fertility evaluation only and 7.8% who had a fertility preservation procedure. The rate of fertility preservation services rose from 6.6% (95%CI, 3.2–10.0) in 2008 to 12.4% (95%CI, 7.3–17.5) in 2017 (P = 0.04) (Fig. 1).

Use of fertility preservation service was more common in patients with testicular (11.6%, aRR = 3.31; 95% CI 2.22–4.92) and prostate cancer (6.1%, aRR = 3.14; 95% CI 1.28–7.70) compared to those with colon cancer (3.4%). Younger men were more likely to utilize fertility preservation services. 11.5% of men age ≤ 35 years vs. 5.2% of men 36–40 used these services (P < 0.0001). Fertility preservation services were used in 10.8% of those who received chemotherapy (aRR = 1.81; 95% CI, 1.45–2.27) and in 8.1% of those who received radiation (aRR = 1.30 95% CI, 0.98–1.73). Medicaid patients were less likely to receive fertility preservation services than those with commercial insurance (0.7% vs. 10.1%; aRR = 11.58, 95% CI 2.10–63.69).

4. Discussion

Fertility preservation services were utilized in fewer than 10% of reproductive-aged men with cancer. These findings are similar to smaller scale single institution studies showing low rates of fertility counseling and referral for sperm banking in young male cancer patients despite the fact that reproductive function is a major concern among patients (Grover et al., 2016). Underuse of fertility preservation is likely driven by a multitude of factors including lack of awareness among patients and providers, cost, patient ambivalence or self-consciousness, and lack of facilities for preservation procedures (Coward et al., 2013)

We recognize several limitations. The use of administrative data may under-capture services paid for out of pocket; we lacked data on men's reproductive history and goals, cultural beliefs, and our cohort was limited to men with incident cancer. We lack data on several important covariates including race/ethnicity, sexual orientation, and tumor characteristics. Furthermore, we were unable to include other common cancers such as leukemia and lymphoma due to challenges in capturing newly diagnosed cases. Nevertheless, these data highlight the urgent need to raise awareness of fertility preservation options for reproductive-aged male oncology patients and to address barriers to reproductive care.

Author contributions

Selter: Conception, study design, data collection, statistical analysis, manuscript drafting, final approval of manuscript.

Huang: Conception, study design, data collection, statistical analysis, manuscript drafting, final approval of manuscript.

Williams: Study design, statistical analysis, final approval of manuscript.

Brady: Study design, statistical analysis, final approval of

Table 1

Rate of fertility services among male reproductive-aged cancer patients.

	Entire Cohort		Fertility Service [^]		P-value	aRR (95% CI) [#]
	N	%	N	%		
All	3648	100.0	340	9.3		
Age (years)					<0.0001	
≤ 35	2389	40.4	274	11.5		1.76 (1.33, 2.34)**
36–40	1259	21.3	66	5.2		Referent
Cancer					<0.0001	
Testicular Cancer	2610	71.6	302	11.6		3.31 (2.22, 4.92)**
Colorectal Cancer	939	25.7	32	3.4		Referent
Prostate Cancer	99	2.7	6	6.1		3.14 (1.28, 7.70)*
Health insurance					<0.0001	
Medicaid	285	7.8	2	0.7		Referent
Commercial	3363	92.2	338	10.1		11.58 (2.10, 63.69)*
Region					<0.0001	
Northeast	622	17.1	100	16.1		1.85 (1.41, 2.45)**
North Central	783	21.5	87	11.1		1.30 (0.98, 1.74)
South	1209	33.1	104	8.6		Referent
West	694	19.0	43	6.2		0.65 (0.45, 0.92)*
Unknown	340	9.3	6	1.8		0.38 (0.08, 1.70)
MSA					<0.0001	
No	418	11.5	31	7.4		Referent
Yes	2881	79.0	300	10.4		1.36 (0.94, 1.97)
Unknown	349	9.6	9	2.6		3.08 (0.94, 10.06)
Elixhauser comorbidity					0.0133	
0	3121	85.6	309	9.9		Referent
1	348	9.5	20	5.8		0.80 (0.51, 1.27)
≥ 2	179	4.9	11	6.2		1.10 (0.59, 2.03)
Year of surgery					0.0963	
2008–2009	644	17.7	52	8.1		Referent
2010–2011	881	24.2	81	9.2		1.07 (0.76, 1.52)
2012–2013	886	24.3	70	7.9		0.96 (0.67, 1.38)
2014–2015	742	20.3	81	10.9		1.34 (0.94, 1.91)
2016–2017	495	13.6	56	11.3		1.49 (1.01, 2.20)*
Radiotherapy					0.1664	
No	2865	78.5	277	9.7		Referent
Yes	783	21.5	63	8.1		1.30 (0.98, 1.73)
Chemotherapy					0.0022	
No	1866	51.2	147	7.9		Referent
Yes	1782	48.9	193	10.8		1.81 (1.45, 2.27)**

[^] Fertility evaluation 4.1%, fertility preservation 7.8%. Some patients (2.6%) had both fertility evaluation and preservation.

[#] aRR: Adjusted risk ratio from multivariable log-linear model.

* P-value < 0.05.

** P-value < 0.0001.

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Melamed: Study design, statistical analysis, final approval of manuscript.

Hershman: Study design, statistical analysis, final approval of manuscript.

Wright: Conception, study design, data collection, statistical analysis, manuscript drafting, final approval of manuscript.

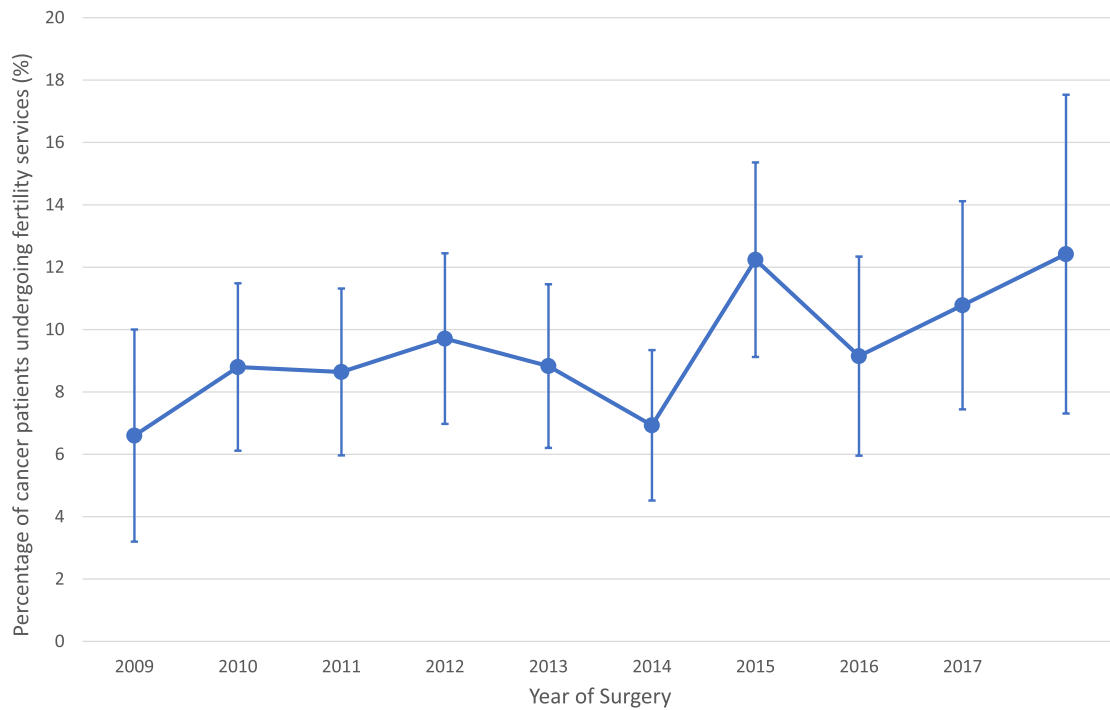


Fig. 1. Use of fertility services over time (P < 0.001).

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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