

A Comparison of Prospectively Collected Genitourinary and Gastrointestinal Toxicities and Dose Volume Histogram in Patients Treated with Intensity-Modulated Radiation Therapy or Non-Intensity-Modulated Post-Operative Radiation Therapy

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Purpose/Objectives

- To compare maximum genitourinary (GU) and gastrointestinal (GI) toxicities between intensity-modulated radiation therapy (IMRT) and conventional radiation therapy (non-IMRT) in post-hysterectomy patients treated for cervical or endometrial cancer
- Analysis of the dose volume histogram (DVH) values that predict grade 2+ GI or GU toxicities

Materials/Methods

- Prospectively collected GU and GI toxicities (CTCAE v4.0) during on-treatment visits (OTVs) were analyzed
- Retrospective review of clinical information was conducted
- For GI: DVHs were generated using both bowel bag and contrast-enhanced loops
- Univariate (UV) and multivariate analysis (MVA) of toxicity, patient characteristics, and DVH parameters was performed using chi-square test and logistic regression

Results

Table 1: Patient Characteristics

	IMRT (N=51)	No IMRT (N=40)	Total (N=91)
AGE > 60	(N=51)	(N=40)	(N=91)
No	26(57.8%)	19(42.2%)	45(49.5%)
Yes	25(54.3%)	21(45.7%)	46(50.5%)
SMOKING	(N=51)	(N=40)	(N=91)
No	35(56.5%)	27(43.5%)	62(68.1%)
Yes	16(55.2%)	13(44.8%)	29(31.9%)
IBS	(N=51)	(N=40)	(N=91)
No	49(55.1%)	40(44.9%)	89(97.8%)
Yes	2(100%)	0(0%)	2(2.2%)
DM	(N=51)	(N=40)	(N=91)
No	45(60%)	30(40%)	75(82.4%)
Yes	6(37.5%)	10(62.5%)	16(17.6%)
BMI	(N=51)	(N=36)	(N=87)
<25	15(53.6%)	13(46.4%)	28(32.2%)
≥30	22(56.4%)	17(43.6%)	39(44.8%)
25-30	14(70%)	6(30%)	20(23%)
DIAGNOSIS	(N=51)	(N=40)	(N=91)
Cervix	10(50%)	10(50%)	20(22%)
Uterine	41(57.7%)	30(42.3%)	71(78%)

Table 2: Univariate analysis for toxicity

Bowel DVH: Median cc (Q1-Q3cc)	< Grade 2 Toxicity	Grade 2+ Toxicity	P Value
V5	1066 (654-1517)	1200 (826-1615)	0.5
V10	907 (588-1392)	1108 (780-1565)	0.36
V15	814 (537-1160)	1037 (680-1499)	0.2
V20	745 (475-1102)	1004 (508-1393)	0.1
V25	605 (408-897)	905 (395-1270)	0.038
V30	466 (327-727)	788 (258-1075)	0.027
V35	398 (271-615)	681 (214-966)	0.4
V40	289 (177-472)	607 (189-887)	0.009
V45	181 (78 - 388)	527 (155-800)	0.005

- 91 patients had OTV information available (Table 1)
- 52 patients with DVH parameters available (28 with IMRT and 24 with non-IMRT)
- Within 5 weeks of treatment, 23.5% patients in IMRT and 40% in non-IMRT had at least one grade 2+ toxicity (p=0.12)
- Bowel V25, V30, V40 and V45 were all significantly associated with increased incidences of any grade 2+ toxicity (Table 2)
- Bowel V10-V40 was significantly associated with any Grade 1 or higher toxicity on UVA
- No significance on MVA analysis
- Bowel V40 and V45 were lower in the IMRT than non IMRT cohorts (median [Q1-Q3] 216cc [145-373cc] vs 570cc [334-668cc])
- The median (Q1-Q3) of bowel V45 were 198.5cc (80.4-456.7cc) among those with < grade 2 GI toxicity vs 526.6cc (147.3-828.8cc) among those with grade 2+ GI toxicity (p=0.03)

Conclusions

- The rates of experiencing at least one grade 2 or higher toxicity were lower for patients treated with IMRT than non-IMRT
- IMRT was associated with a lower bowel V40 and V45 in this group of post hysterectomy patients