Effective Pain Management with Prophylactic Gabapentin in the Irradiated Head and Neck Cancer Patient is Associated with Functional Benefits

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Purpose/Objectives

❖ Acute mucositis and its secondary pain are common toxicities during radiotherapy (RT) for head and neck cancer, leading to treatment interruptions and dysphagia.

❖ Dysphagia leads to
 -weight loss during treatment
 -disuse atrophy of the swallow muscles

❖ We hypothesize that mucositis pain is mediated by peripheral pain sensitization which is inhibited by prophylactic gabapentin and low-dose narcotics.

Materials/Methods

❖ Retrospective query and analysis of prospectively acquired structured data elements (SDEs) during routine clinical care held in the integrated dosimetric and clinical database (Mosaiq/Oncospace®) was undertaken.

❖ Head and Neck cancer patients treated with Intensity-Modulated Radiation Therapy (IMRT) from 2007-2014 were grouped based on pain management strategies:
1) Traditional (2007-2011)
   - routine use of narcotics reactive to pain
2) Gaba (2011-2013)
   -prophylactic gabapentin with narcotics as needed
3) Gaba + Oxy (2013-now)
   -prophylactic gabapentin with prophylactic low-dose narcotics titrated to effect

❖ We evaluated:
1) During treatment:
   - pain scores
   - treatment time
   - absolute weight change
   - equivalent oxycodone dose
2) Post-treatment:
   - Penetration Aspiration Scores (PAS), abnormal if >2
   - Functional Oral Intake Scale (FOIS), abnormal if <4
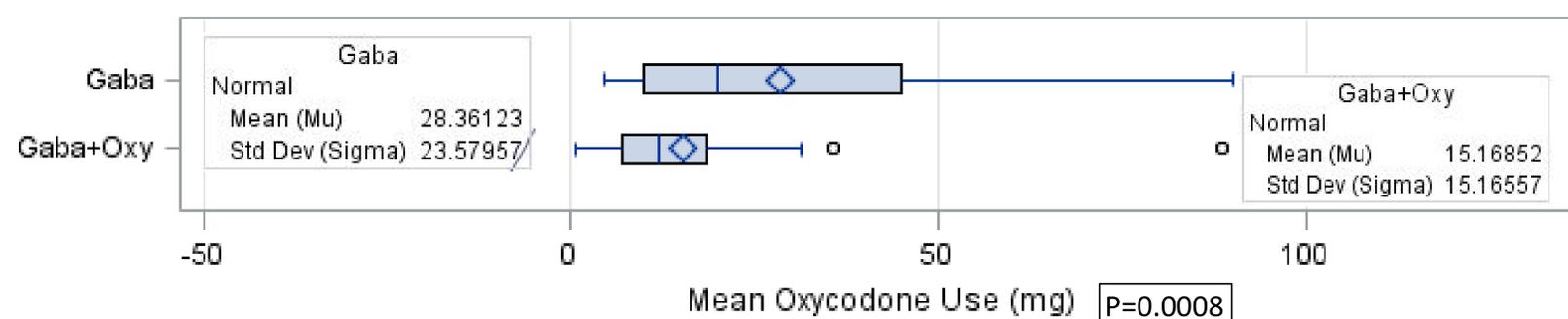
❖ ANOVA, Tukey, Chi-square, t-test was used

Results

❖ The patient characteristics (age, sex, race, concurrent chemotherapy, RT dose, fractions, TNM staging and tumor site) were analyzed by descriptive statistics (Table1).

❖ Gabapentin-based pain management of acute mucositis is effective and associated with
1) less weight loss, radiotherapy treatment interruptions, lower oxycodone dose during treatment despite a higher proportion of patients treated to higher doses with hyperfractionated RT (Table2, Figure1)
2) Post-treatment swallow function and oral diet level appears to be improved (Table2)

Table 1. Demographic data among groups by pain medication (n=521)

	Traditional (n=305)	Gaba (n=171)	Gaba+Oxy (n=45)	p-value
Onset Age, year, Mean (SD)	59 (11)	58 (12)	59 (11)	0.8037
Male, N (%)	235 (77)	131 (76)	32 (71)	0.6793
Caucasian, N (%)	202 (66)	93 (54)	27 (60)	0.0373
Radiation Dosage, cGy, Mean (SD)	6665 (467)	6897 (391)	6803 (521)	<.0001
Fractions, Mean (SD)	34 (4)	35 (6)	35 (6)	0.0164
Site, Pharynx, N (%)	125 (41)	84 (49)	26 (58)	0.0433
Chemotherapy, N (%)	146 (48)	123 (72)	28 (62)	<.0001
N Stage, ≥N2, N (%)	117 (63)	82 (55)	22 (67)	0.2286
T Stage, ≥T3, N (%)	64 (34)	66 (43)	12 (36)	0.2229

Figure1. Equivalent oxycodone use among group by pain medication

Gaba — Normal — Mean (Mu) 28.36123 — Std Dev (Sigma) 23.57957
Gaba+Oxy — Normal — Mean (Mu) 15.16852 — Std Dev (Sigma) 15.16557
Mean Oxycodone Use (mg) — P=0.0008

Table 2. Pain and secondary outcomes among group by pain medication

	Traditional	Gaba	Gaba+oxy	p-value
Pain Score (0-10)	Mean(SD)	Mean(SD)	Mean(SD)	<.0001
Max Pain Score	4.50 (2.38)	3.64 (2.40)	3.27 (2.25)	
Mean Pain Score	2.21 (1.46)	1.61 (1.34)	1.34 (1.06)	
Tx Duration, day	47.74 (5.50)	44.22 (6.95)	44.16 (7.08)	<.0001
Weight Loss				
Kg,	6.55 (4.09)	5.91 (3.65)	5.01 (3.21)	0.0285
%	8.86 (5.47)	7.79 (4.60)	6.87 (4.28)	0.0158
PAS score (1-8)	3.88 (3.08)	2.40 (2.25)	1.30 (1.11)	0.0010
FOIS score (1-7)	3.33 (2.06)	5.26 (1.67)	5.13 (1.55)	0.0001

Conclusions

➤ Systematic capture of SDEs facilitates large data analysis of the impact of systematic changes in practice patterns.

➤ Prophylactic gabapentin appears to improve pain with less interruptions RT, narcotics use and improved oral intake.