PENCIL BEAM SCANNING INTENSITY MODULATED PROTON THERAPY (PBS-IMPT) FOR ANAL CANAL CANCER – LESS LYMPHOPENIA, LESS TOXICITY, FAVORABLE EFFICACY

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Introduction:

A significant improvement in toxicity, except haematologic, was achieved with IMRT for anal canal squamous cell cancer(1). The recent feasibility studies indicated further reduction of toxicity with PBS IMPT(2). The primary objective of the single institution study was to confirm the efficacy of PBS IMPT. The secondary objectives were first to summarize acute and late toxicities, second to find any impact of toxicity on prognosis.

Patients, methods:

Patients were only treated for biopsy proven squamous cell cancer (SCC) of the anus, The eligible patients received PBS-IMPT (230 MeV) in 2 volumes: 1 – tumor with margins plus involved lymph nodes, 2 – regional lymph node groups perirectal (mesorectal), obturatory, inguinal, internal and external iliac. The total dose 57,5 GyE and 45 GyE/25 fractions/5 fractions a week was administered to volume 1 and 2, respectively. Concomitant chemotherapy CDDP) plus 5-FU or CDDP plus capecitabine was administered per protocol. Treatment effect was assessed upon DRE and MRI within the follow up period. Toxicity was scaled using CTCAE v. 5.0 criteria.

Patient characteristics:

n	62
Median age at IMPT initiation	59 Y (41-82)
Gender	F 53 / M 9
Stage (UICC 8th edition)	nr. (%)
T1N0M0	4 (6,5%)
T2N0M0	22 (35,5%)
T3N0M0	8 (12,9%)
T4N0M0	2 (3,2%)
T1N1a-cM0	1 (1,6%)
T2N1a-cM0	10 (16,1%)
T3N1a-cM0	8 (12,9%)
T4N1a-cM0	7 (11,3%)

Results:

Efficacy:

Complete regression	58 (93,5%)
Partial regression	2 (3,2%)
Progression/Stable disease	2 (3,2%)

Median follow up: 41 months

Pattern of relapse:

Local/locoregional	7 (11,3%)
Distant metastases	2 (3,2%)

Survival data:

3 year survival	88,4±4,5%
3 year relapse free survival	83,1±3,1%
3 year colostomy free survival	93,9±3,5%

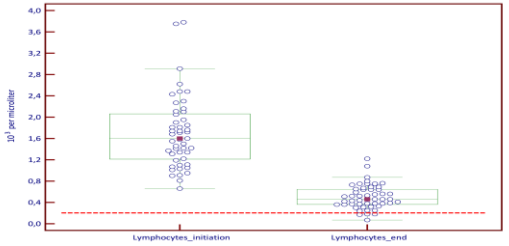
Toxicity data:

Acute toxicity	
Haematologic	G3 5,0%, G4 6,6%
Dermatitis	G3-G4 24,0%
Colitis	G3-G4 8,3%
Dehydration	G3-G4 10,0%
Late toxicity	
Radiation proctitis	G1-G2 45,0%, G3 5,0%
Anal stenosis	G1-G2 6,6%, G3 5,0%
Perianal dermatitis, skin fibroatrophy	G1-G2 38,3%, G3 1,7%
Functional disorders	G1-G2 23,3%, G3 3,3%

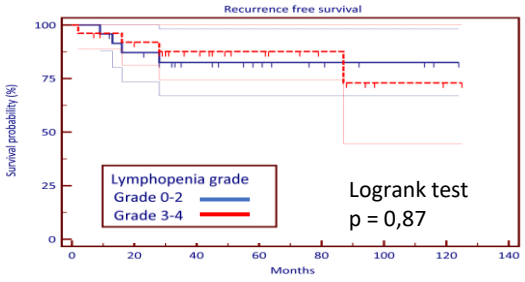
Treatment related lymphopenia:

Lymphopenia grade	G0	G1	G2	G3	G4
Treatment initiation	94%	4%	2%	0	0
Treatment end	4%	4%	40%	**44%**	**8%**

Lympohcyte counts, treatment initiation vs. end:



Lymphopenia grade 0-2 vs. 3-4, RFS not significantly different:



Discussion, conclusions:

Favorable regression rate and survival data have been achieved.

Acute toxicity was moderate with low rate of lymphopenia grade 4. The number of patients developing gr. 4 has lymphopenia had not a statistical power to prove prognostic significance.

Late toxicities (proctitis, dermatitis, stenosis, functional disorders) rarely resulted in persistent discomfort and morbidity and the colostomy free survival remained low.

The data are promising and support IMPT as a reasonable option for current and future routine therapy.

References: 1. Frontiers in Oncology 2022; 12: art. 911925
2. Int. J. Radiat. Oncol. Biol. Phys. 2019; 105: 90-95

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