Real-world clinical outcomes of stereotactic MR-guided adaptive radiotherapy (SMART) for localised pancreatic cancer: A retrospective cohort analysis

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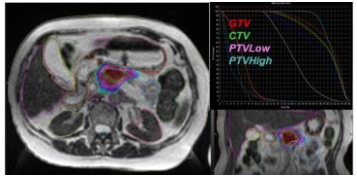
Background

SABR is an option for locally advanced pancreatic cancer (LAPC). However, target motion and proximity to OAR remain key challenges. Severe toxicity has been reported with CT-based platform. SMART may overcome these pitfalls, with promising outcomes and low toxicity reported[1,2]. Following our initial experience[3], outcomes from a large cohort treated with daily-adaptive SMART are now presented

Methods

Resectable medically inoperable, borderline operable, locally recurrent or LAPC who received SMART were included in this single-centre retrospective analysis (*Table 1*). All delivered fractions were adapted and re-optimised



Representative plan of 25 Gy, single fraction. MIM® 7.2.8. 1 Planning System

Toxicities (CTCAEv5.0 scale), local control (LC), local progression-free survival (LPFS), metastases-free survival (MFS) and overall survival (OS) were evaluated. Electronic patient records were used to obtain data

Table 1. Demographics

Median Age	69 years (36-89)
Most Common Tumour Site	Head of Pancreas: 67.5% (n=79)
ECOG 0-1 (%)	100%
Induction Chemotherapy (%)	84.6%
Median prescribed Dose, Gy (range)	40 Gy (range 25-50Gy)/1-5#
Median time from diagnosis to SMART, months (range)	8 months (range 1-85 months)
Fractions adapted (%, n)	100%, 532 (2 patients did not complete treatment)

Results

Between **September 2020 to October 2023, 117 patients** underwent SMART to pancreatic cancer

Toxicity (*Table 2*):

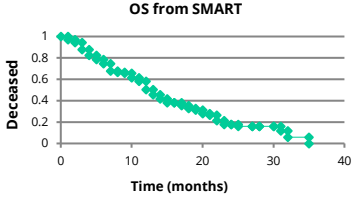
- **Fatigue** was the most prevalent acute side effect (48%)
- Acute G3 toxicity was fatigue, nausea, abdominal pain, diarrhoea, anorexia and cholangitis/biliary obstruction
- **13.7% showed late G3** toxicity
- No early/late G4 toxicity was detected

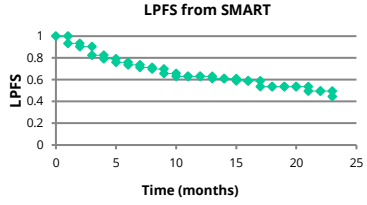
Table 2. Acute Tox (<3mo) CTCAE*	n=117	%
patients with any AEs grade	85	72.65
G0	30	25.64
G1	46	39.32
G2	24	20.51
G3	15	12.82
G4	0	0.00

*Shows as worst acute treatment-related toxicity grades

Median follow-up from diagnosis was **19 months (range 3-109 months**). At the time of analysis:

- Missing data n= 9
- **36%** of the patients **relapsed locally**
- **55.5%** demonstrating **distant progression**, being **liver (24.5%) and lung (23.6%)** the most common sites of metastasis
- 36% were alive
- Median **LPFS and MPFS** from SMART were **10 months (SD ±8) and 8.5 months (SD±6.6**), respectively
- **Median, 1-year and 2-year OS** were 11 months (range 1-35 months), 50.3% and 17.9%, respectively (*Table 3*)





Conclusion

In this real-world cohort of predominantly non-resectable pancreatic cancer, **toxicity and survival outcomes were largely comparable to the SMART trial** [2] *(Table 3).* However, long-term survival was inferior. This may have resulted from the lower radiation dose used **(40Gy/5 vs 50Gy/5),** patient heterogeneity or possible selection bias.

Table 3.Key survival outcomes compared to the SMART trial[1,2]

Parameters (from SMART)	Current cohort	SMART trial
1-Year OS, %	50.3%	65%
2-Year OS, %	17.9%	26% (unresected cohort)
Median OS, m	11 m (1-35 m)	14.2 m
1-year LC, %	68%	76%*
2-year LPFS, %	44.7%	71% (unresected cohort)
2-year MFS, %	13.4%	22% (unresected cohort)

OS: Overall Survival; LC: Local Control; LPFS: Local Progression Free Survival; MFS: Metastases Free Survival
** Read off Local control graph, non-resected patients' SMART trial (Figure 2f)[2]*

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