
XXXIII CONGRESSO NAZIONALE AIRO
AIRO2023
BOLOGNA,
27-29 OTTOBRE 2023
PALAZZO DEI CONGRESSI
Radioterapia Oncologica: l'evoluzione al servizio dei pazienti
Associazione Italiana
Radioterapia e Oncologia clinica

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Radioterapia Oncologica: l'evoluzione al servizio dei pazienti

STUDIO PROSPETTICO DI FASE 2 SULLA RADIOTERAPIA STEREOTASSICA ABLATIVA DOPO CHEMIOTERAPIA DI INDUZIONE NEI PAZIENTI CON TUMORE DEL PANCREAS LOCALMENTE AVANZATO NON RESECABILE: RISULTATI FINALI DELLO STUDIO LAPC02 (NCT03158779)

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Associazione Italiana
Radioterapia e Oncologia clinica

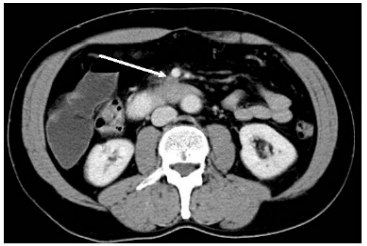
No disclosures

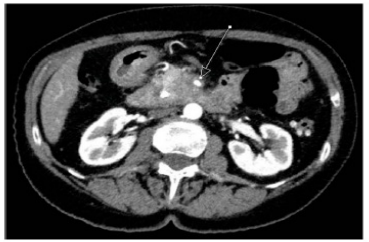
Heinrich et al, Int J Molecular sciences, 2018

Background

- **The best option for cure for a patient with pancreatic cancer is a surgical excision**
- **Less than 20%-30% of pancreatic tumors are resectable at the time of diagnosis**

	Resectable	Borderline Resectable	Unresectable/Locally Advanced
SMA/CA	No contact	<180°	>180° involvement
PV/SMV	No contact	>180°	No reconstruction possible
		Potentially resectable	





Chemotherapy

Chemo- radiation treatment

Heinrich et al, Int J Molecular sciences, 2018

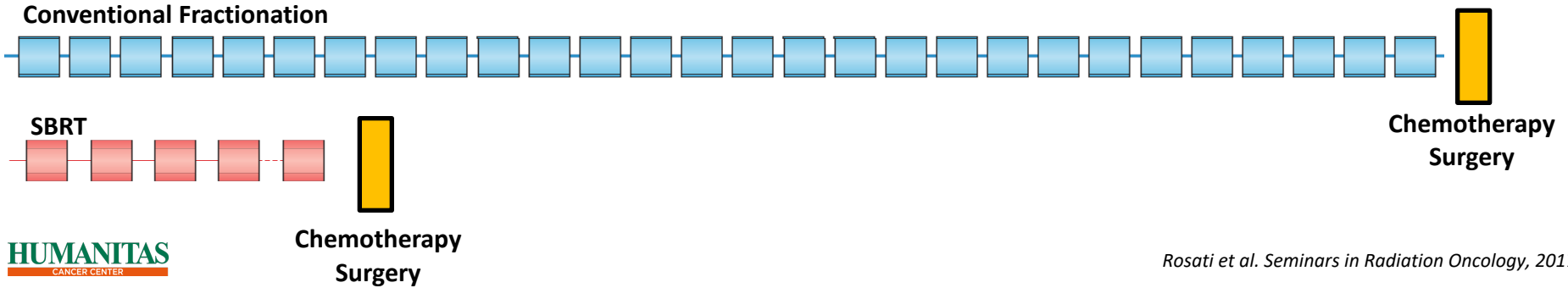
Background

1. **SBRT** can be delivered over **3-5 days** in comparison to **25-30 days** with conventional chemo-radiation (CRT)

2. **SBRT limits the delay of additional therapies** (chemotherapy or surgery, if needed)

3. **SBRT** allows the **precise delivery of high radiation dose** to the tumor while **minimizing dose to surrounding normal structures**

4. **Decrease toxicity**



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Rosati et al. Seminars in Radiation Oncology, 2017

VOLUME 34 · NUMBER 22 · AUGUST 1, 2016
JOURNAL OF CLINICAL ONCOLOGY
ASCO SPECIAL ARTICLE

Locally Advanced, Unresectable Pancreatic Cancer: American Society of Clinical Oncology Clinical Practice Guideline

Edward P. Balaban, Pamela B. Mangu, Alok A. Khorana, Manish A. Shah, Somnath Mukherjee, Christopher H. Crane, Milind M. Javle, Jennifer R. Eads, Peter Allen, Andrew H. Ko, Anitra Engebretson, Joseph M. Herman, John H. Strickler, Al B. Benson III, Susan Urba, and Nelson S. Yee

Recommendation 2.1: […] **CRT or SBRT may be offered up front**, on the basis of patient and physician preference […]

Recommendation 3.1: If there is **local disease progression after induction chemotherapy**, but without evidence of systemic spread, then **CRT or SBRT may be offered** to the patients

Recommendation 3.2: CRT or SBRT may be offered to patients who have **responded to initial 6 months of CT** or have **stable diasese** but have developed **unacceptable CT-related toxicities** […]

Recommendation 3.3: if there is **response or stable disease after 6 months of induction CT**, **CRT or SBRT may be offered as an alternative** to continuing CT alone for any patient with LAPC

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Studi prospettici sulla SBRT in pazienti affetti da BRPC o LAPC dal 2013 al 2021

Autore (anno)	Pazienti (n)	Stadio	Dose di SBRT (Gy/frazione)	Follow up mediano (mesi)	LC	PFS	OS	Tossicità Gastrointestinale ≥G3 (%)
M. K. Gurka (2013)	11	LAPC	25 Gy/5 fr	Nd	Nd	mPFS: 6.8 mesi	mOS: 12.2 mesi	Acuta ≥G3: 0% Tardiva ≥ G3: 0%
A. Tozzi (2013)	30	LAPC Recidiva chirurgica	45 Gy/6fr	11 mesi	1y: 77% 2y: 75%	mPFS: 8 mesi	mOS: 11 mesi 1y: 47%	Acuta ≥G3: 0% Tardiva ≥G3: 0%
J. M. Herman (2015)	49	LAPC	33 Gy/5 fr	13.9 mesi	1y: 78%	mPFS: 7.8 mesi 1y: 32% 2y: 10%	mOS: 13.9 mesi 1y: 59% 2y: 18%	Acuta G3: 10.2% G4: 2% Tardiva G3: 6.4% G4: 2%
T. Comito (2017)	45	LAPC	45 Gy/6fr	13.5 mesi	mLC: 26 mesi 1y: 87% 2y: 87%	mPFS: 8 mesi 1y: 39% 2y: 15%	mOS: 13 mesi 1y: 59% 2y: 18%	Acuta ≥G3: 0% Tardiva ≥G3: 0%
M. Teriaca (2021)	39	LAPC	40 Gy/5fr	13 mesi	mLC: 36.3 mesi 1y: 81% 3y: 53%	mPFS: 10.7 mesi 1y: 43% 3y: 15%	mOS: 18 mesi 1y OS 77% 3y OS 13%	Acuta G3: 10.2%
X. Chen-Zhao (2020)	45	LAPC (20) BRPC (25)	40-62 Gy/5-10 fr	14.7 mesi	1y: 95%	1y: 72% 2y: 58%	mOS: 13.8 mesi 1y: 67% 2y: 36%	Acuta ≥G3: 0% Tardiva ≥G3: 0%
X. Zhu (2021)	63	LAPC	35-40Gy/5fr	15.8 mesi	Nd	mPFS: 10.1 mesi	14.4 mesi	Acuta G3: 14.3% Tardiva G3:4.8%

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Phase 2 trial evaluating ablative stereotactic body radiotherapy (SBRT) after induction chemotherapy (CHT) for patients with Locally Advanced unresectable Pancreatic Cancer: Final results of LAPC02 Study (NCT03158779).

- **PRIMARY END POINTS:**
- **To evaluate outcomes in terms of overall survival (OS) of SBRT after induction CT with FOLFIRINOX or Gemcitabine-NabPaclitaxel in locally advanced unresectable pancreatic cancer.**

- **SECONDARY END POINTS**
- **To evaluate acute and late toxicity ,freedom from local progression (FFLP) an progression free-survival(PFS).**

- **To evaluate technical success of EUS-guided fiducials placement (feasibility of the placement, technical difficulties, fiducials migration, adverse events).**

From 2017 to 2019, we enrolled 45 patients, with a median follow up of 23.2 months
Prescription dose: 54 Gy in 6 daily fractions of 9 Gy

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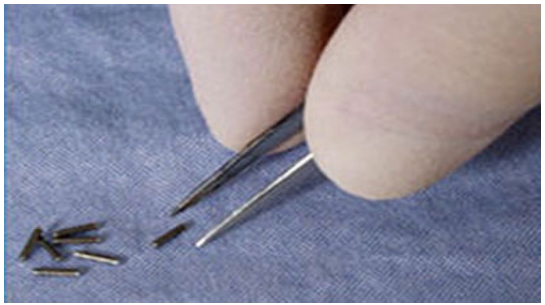
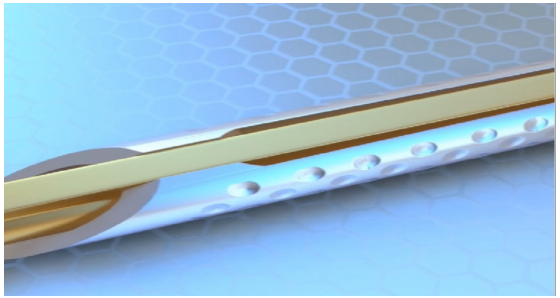
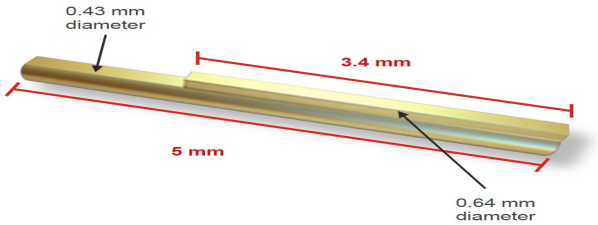
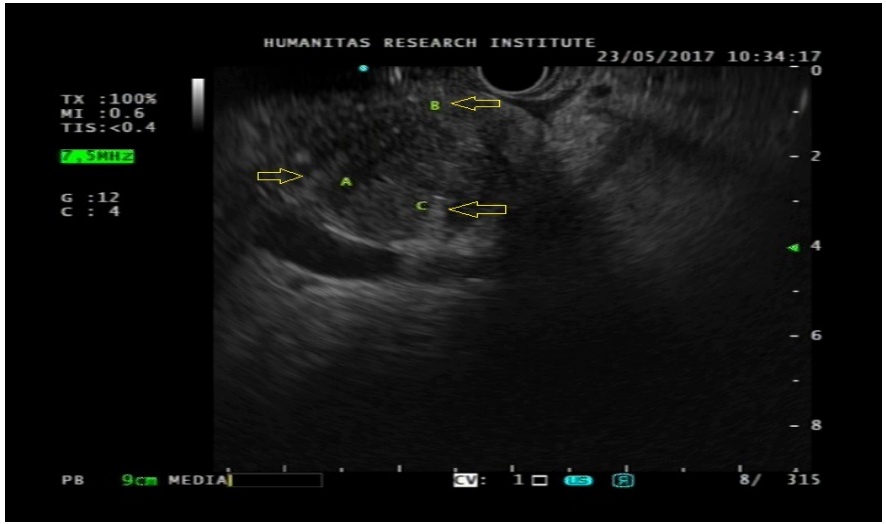


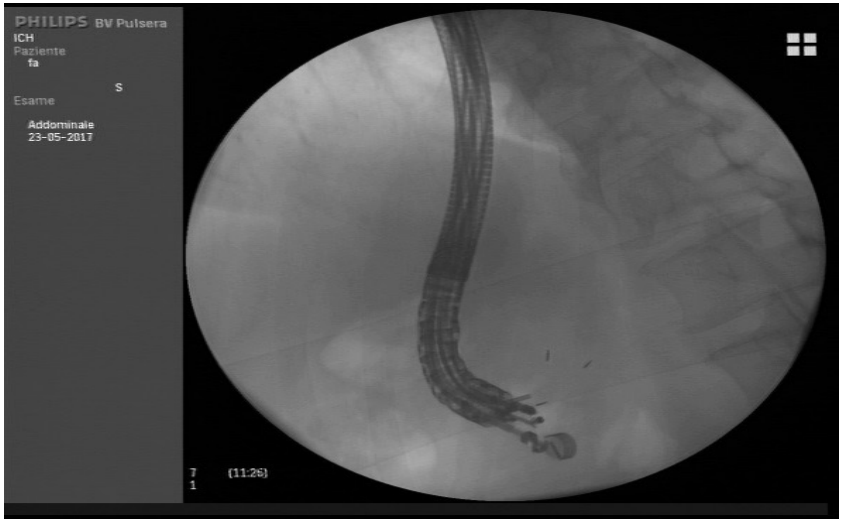


A new dedicated needle was used: a **22G needle preloaded** with **4 gold fiducials** (0.43 mm of diameter for 5 mm length).





The fiducials were released under EUS guidance and it were placed at the opposite extremities of the tumor.



Fluoroscopy was used to confirm the position

Endoscopic Ultrasound

2021

EUS-guided placement of fiducial markers for image-guided radiotherapy in gastrointestinal tumors: A critical appraisal

Silvia Carrara[1], Mihai Rimbas[2], Alberto Larghi[3,4], Milena Di Leo[1], Tiziana Comito[5], Joseph Abi Jaoude[6], Cullen M. Taniguchi[6], Christoph F. Dietrich[7], Manoop S. Bhutani[8], Stephan Hollerbach[9]

12 patients (8 F/4 M) aged 66.5 years (53-80 range) were enrolled **in LAPC02 trial** and **candidated to fiducials placement**

In all but one patient 2-4 markers were placed.

In 5 of 12 patients procedure had no technical difficulties.

In 7 patients, fiducial placement was made difficult due to:

- **increased hardness of lesion**
- **nearest vessels** (infiltrated portal vein or collateral vessels due to portal hypertension)
- **poor control in the first marker release** (two fiducials released in the same position).

Patients started SBRT with a **median gap time of 10.2 days** (range 6-19 days) between the fiducials placement and the first fraction.

Only one patient, in whom the simulation CT was performed at the same day of the Fiducial placement, showed a **minimal migration of one fiducial (<3 mm) when SBRT was started**

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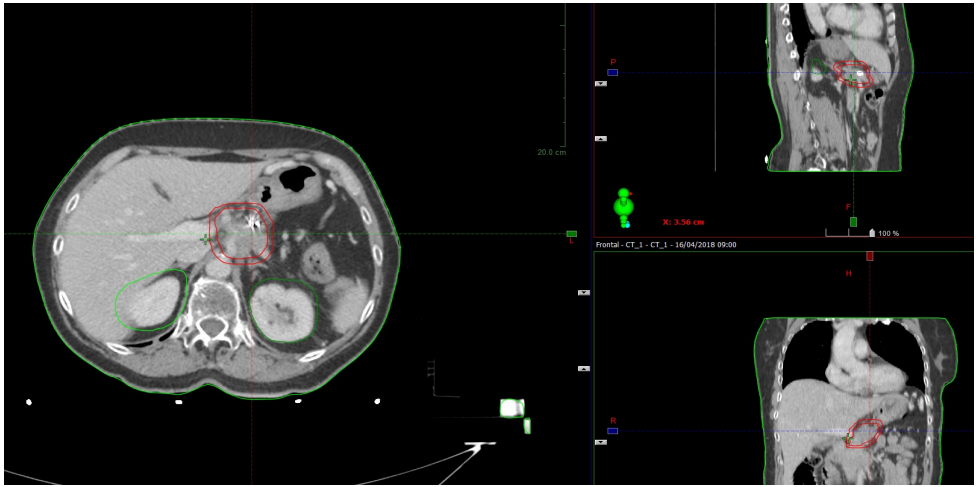

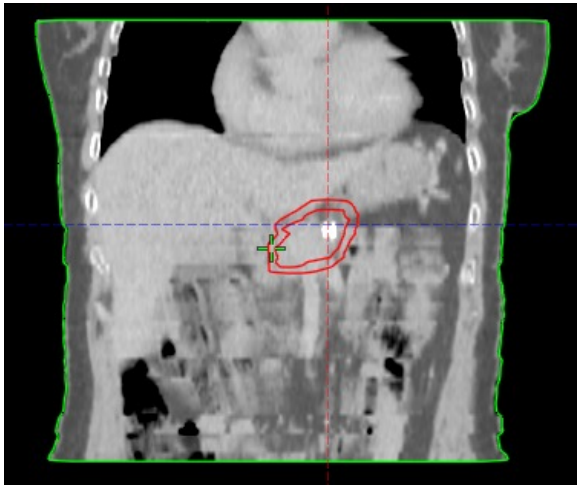

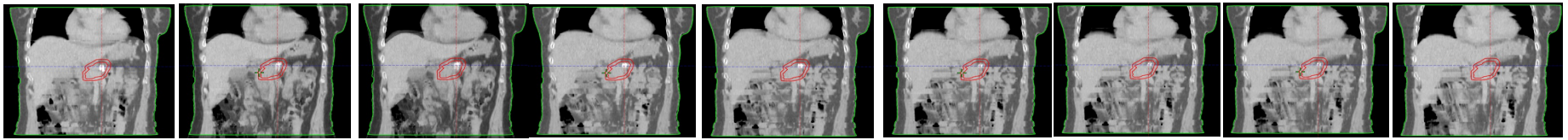

CT10 CT20 CT30 CT40 CT50 CT60 CT70 CT80 CT90

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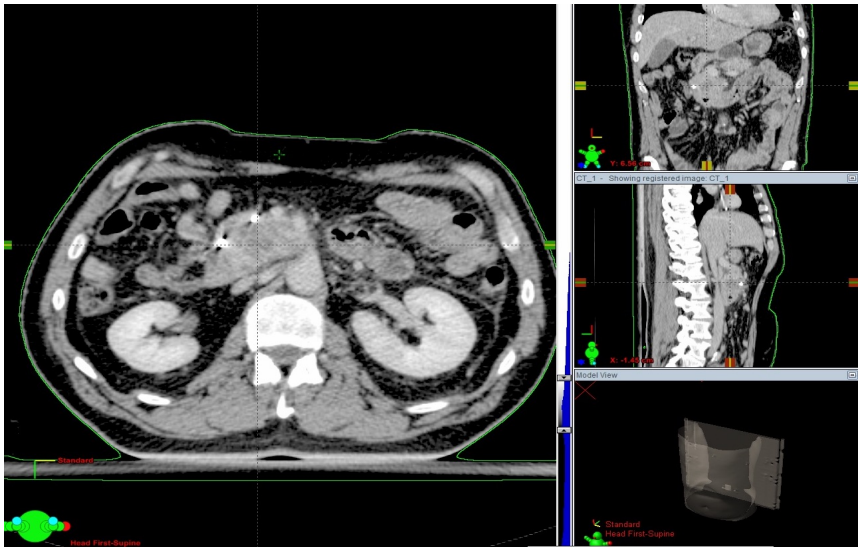
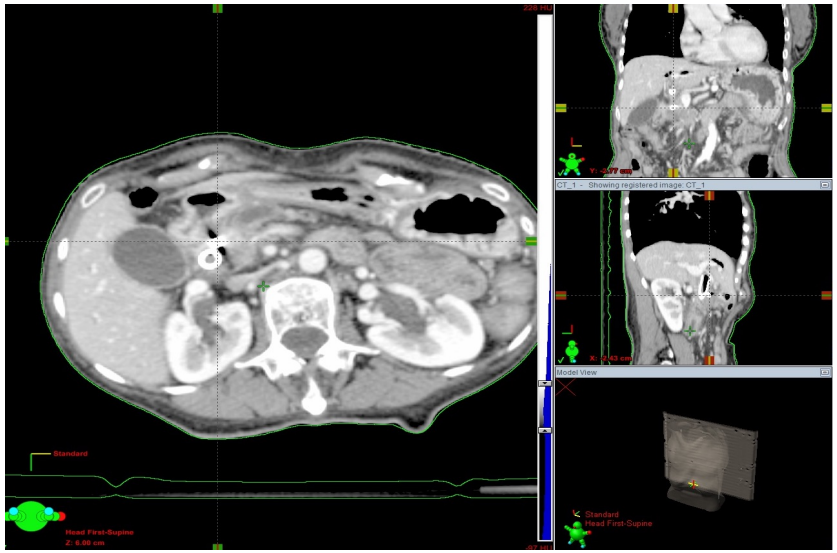
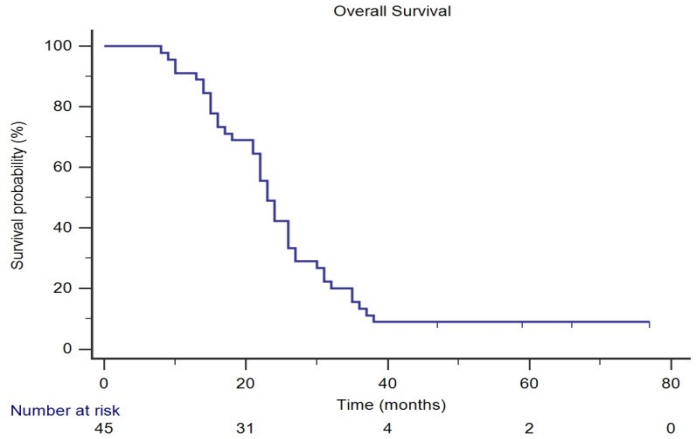

CT_1 - Showing registered image: CT_1
Model View
Standard
Head First-Supine

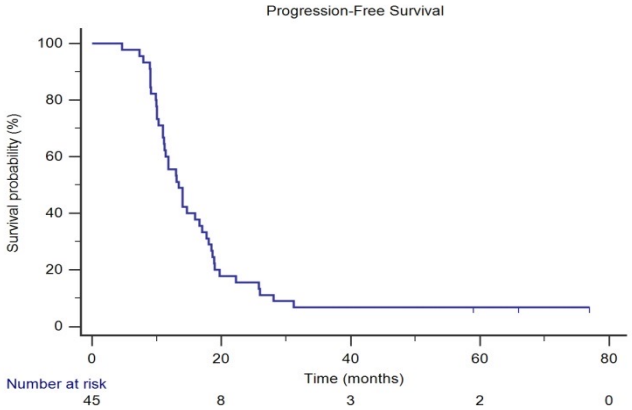

CT_1 - Showing registered image: CT_1
Model View
Standard
Head First-Supine

OS: : median 23,2 months

- 1 year OS rate = 91,1%
- 2 years OS rate = 46,7%
- 3 years OS rate = 15,6%

At multivariate analysis, **CHT response was related to a better OS (p= 0.015).**





PFS: median 13,4 months

- 1 year PFS rate = 55,6%
- 2 years PFS rate= 15,6%
- 3 years PFS rate= 6,7%

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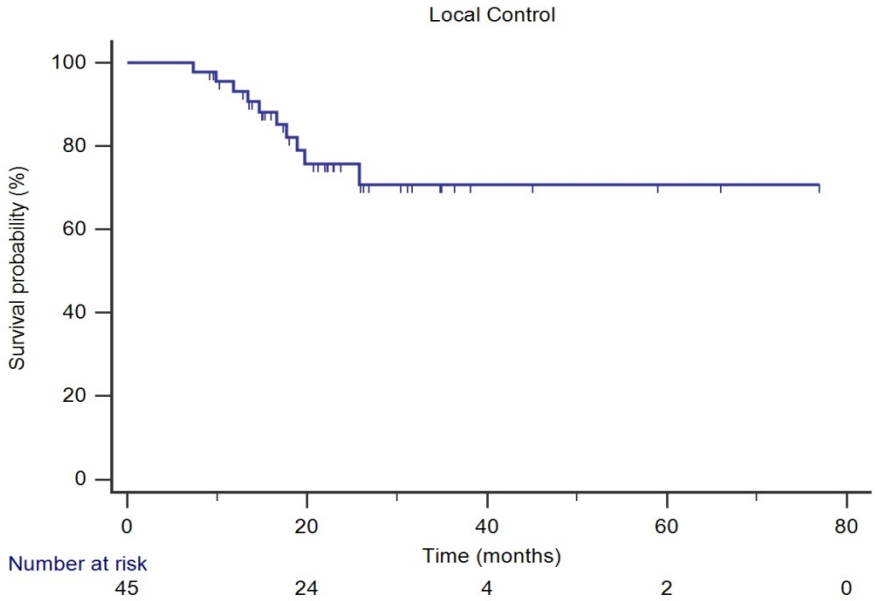
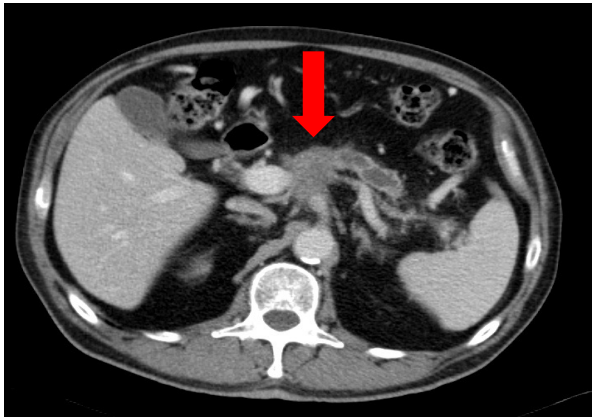
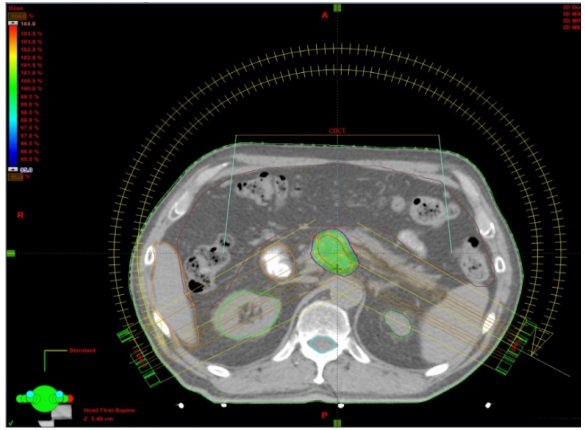
LC: median not reached

- 1 year LC rate = 93,1%
- 2 years LC rate = 75,7%
- 3 years LC rate = 70,7%
- 5 years LC rate = 70.7%

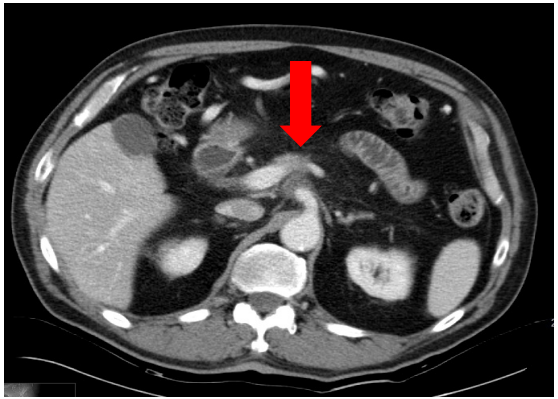




TC before SBRT



54 Gy/6fr



TC after 6 months

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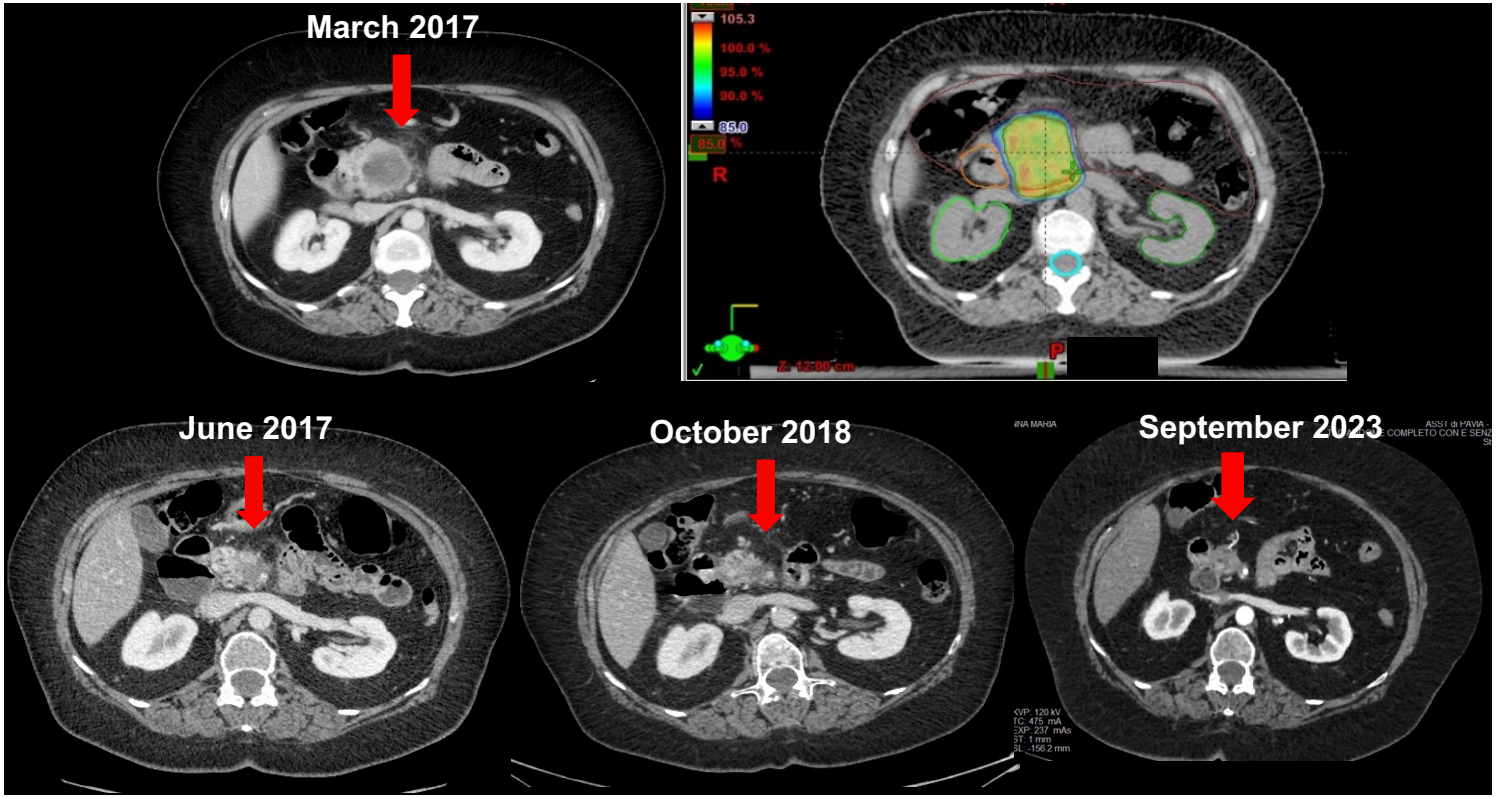

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Conclusions

- **SBRT** represents a valid local approach for **unresectable LAPC**, characterized by a **short overall treatment time**, **higher ablative dose** and **low toxicity profile.**

- **Multimodality treatment of induction CHT and ablative SBRT** showed promising **results in terms of OS and local control** for patients with unresectable LAPC. **Tumor response after induction CHT proved to be a significant prognostic factor for survival.**