

Correlazione tra dose incidentale
alla milza e tossicità ematologica nel
trattamento radioterapico delle
neoplasie dell'alto addome

PROPOSTA DI STUDIO RETROSPETTICO

Irradiazione incidentale della Milza nei trattamenti RT dell'alto addome

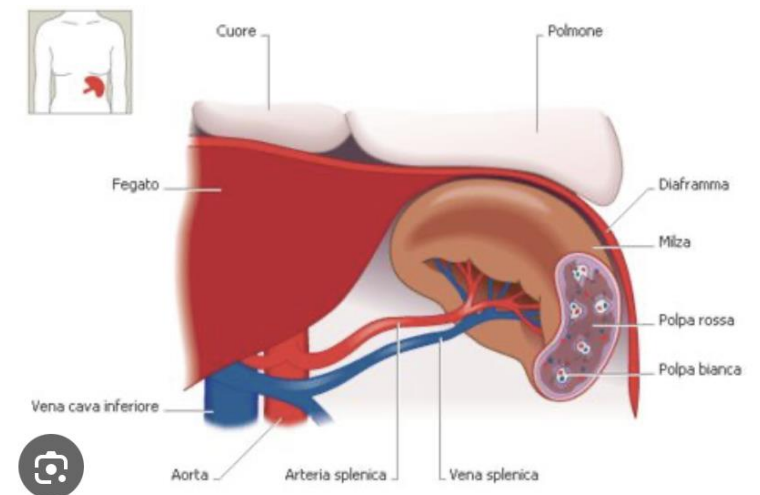
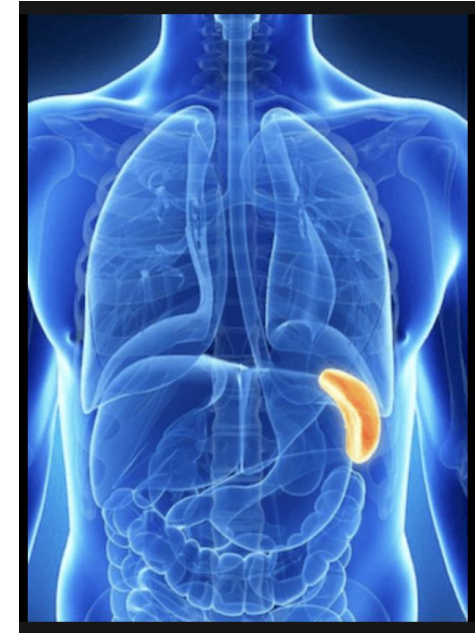
La milza

—> è l'organo linfoide secondario più grande del sistema linfatico.

—> è collegata al sistema circolatorio per mezzo di vasi sanguigni e non linfatici.

Le sue funzioni possono essere raggruppate in tre classi:

1. filtrazione delle sostanze estranee dal sangue per fagocitosi;
2. organo secondario del sistema immunitario: ospita nella sua polpa bianca sia linfociti T sia centri germinativi contenenti soprattutto linfociti B e partecipa all'avvio della risposta immunitaria tramite la presentazione di antigeni circolanti
3. riserva: è in grado di immagazzinare una notevole quantità di monociti e piastrine.



Irradiazione incidentale della Milza nei trattamenti RT dell'alto addome

L'iposplenismo indotto da radioterapia è stato per la prima volta descritto negli anni 1980.

MEDICAL INTELLIGENCE ARCHIVE

Radiation-Induced Splenic Atrophy in Patients with Hodgkin's Disease and Non-Hodgkin's Lymphomas

Morris O. Dailey, M.D., Ph.D., C. Norman Coleman, M.D., and Henry S. Kaplan, M.D.

January 24, 1980

N Engl J Med 1980; 302:215-217

DOI: 10.1056/NEJM198001243020406



Case report: riscontro autoptico di atrofia splenica in una donna di 24 anni radiotrattata all'età di 12aa per un linfoma di Hodgkin e deceduta per sepsi

Coleman et al (1982): dosi di 40 Gy di radioterapia a livello della milza potrebbero portare a iposplenismo a distanza di 4-5 anni dalla radioterapia.

Short Papers | 1 January 1982

Functional Hyposplenism After Splenic Irradiation for Hodgkin's Disease

C. NORMAN COLEMAN, M.D., I. ROSS MCDUGALL, M.B., Ch.B., Ph.D., MORRIS O. DAILEY, M.D., Ph.D., ... [See More](#) +

[Author, Article, and Disclosure Information](#)

<https://doi-org.bvsp.idm.oclc.org/10.7326/0003-4819-96-1-44>

Nonostante tali dati pubblicati negli anni '80, la milza storicamente è stata di rado considerata un organo a rischio

Irradiazione incidentale della Milza nei trattamenti RT dell'alto addome

Late Infection-Related Mortality in Asplenic Survivors of Childhood Cancer: A Report From the Childhood Cancer Survivor Study

VOLUME 36 · NUMBER 16 · JUNE 1, 2018

JOURNAL OF CLINICAL ONCOLOGY

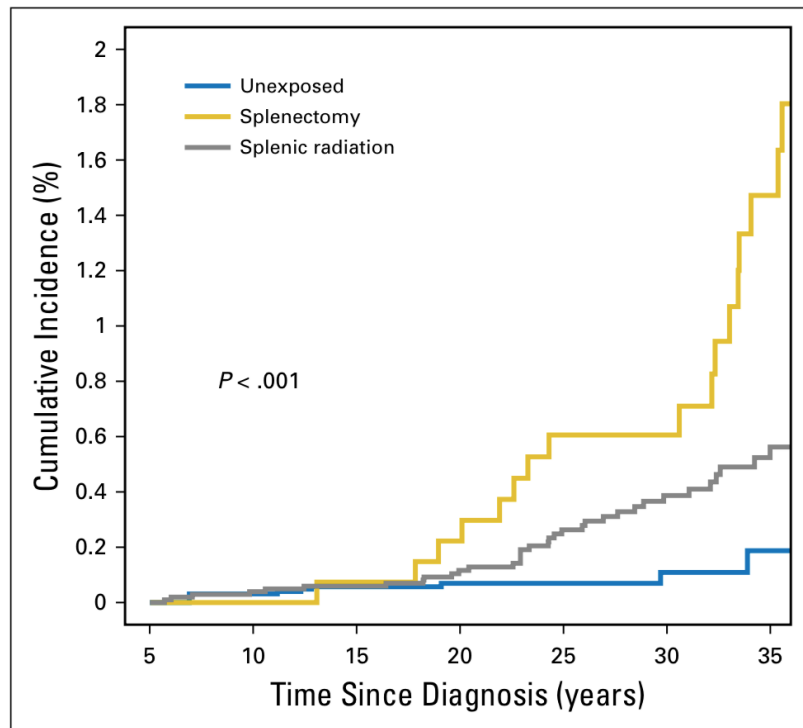


Fig 2. Cumulative incidence of late infection-related mortality among survivors undergoing splenectomy or splenic radiation or those unexposed to either treatment.

Study of 20,026 survivors of childhood cancer diagnosed aged ≤ 21 years

OBV: assessed the long-term impact of splenic radiotherapy

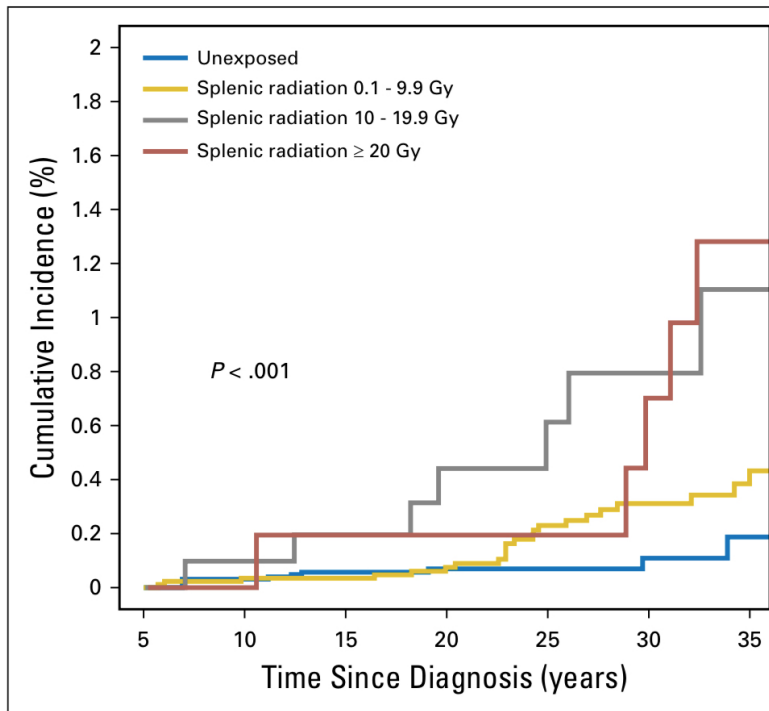


Fig 3. Cumulative incidence of late infection-related mortality among survivors receiving splenic radiation doses of 0.1 to 9.9 Gy, 10.0 to 19.9 Gy, or ≥ 20.0 Gy.

Splenic radiotherapy was associated with:

I) Increased late infection-related mortality

II) Increased cumulative incidence of late infection-related mortality at 35 years.

This appeared to be related to radiotherapy dose, with increasing risk relating to escalating dose. Even moderate radiotherapy doses (>10 Gy) were associated with increased risk.

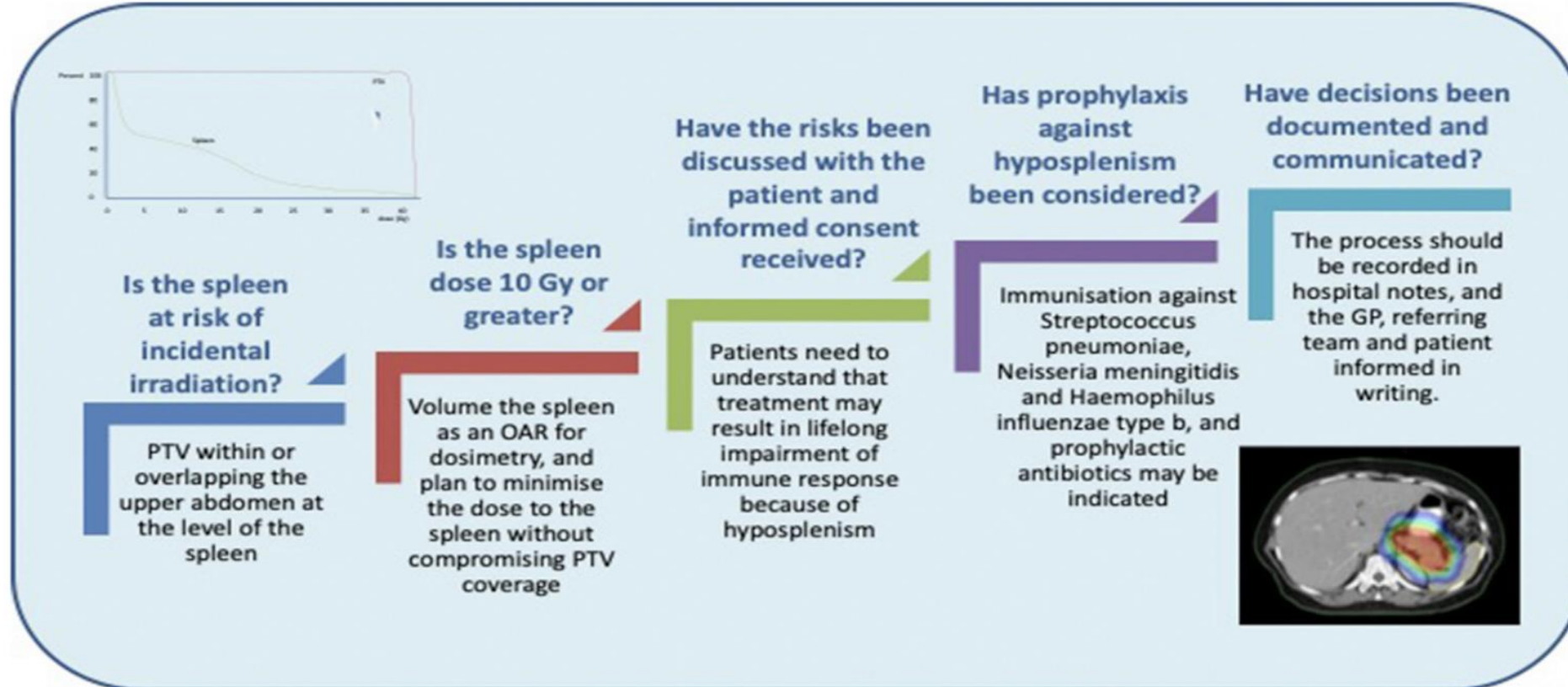
Incidental irradiation of the spleen RCR guidance



New Guidance From The Royal College of Radiologists on Incidental Irradiation of the Spleen: What Does it Say and Why Does it Matter?

K. Keshwani, T.M. Richards, B.M. Seddon, M.N. Gaze

Department of Oncology, University College London Hospitals NHS Foundation Trust, London, UK



Irradiazione incidentale della Milza nei trattamenti RT dell'alto addome

The role of bone marrow and spleen irradiation in the development of acute hematologic toxicity during chemoradiation for esophageal cancer

Alexander L. Chin MD, MBA, Sonya Aggarwal BS, Pooja Pradhan BS, Karl Bush PhD, Rie von Eyben MS, Albert C. Koong MD, PhD, Daniel T. Chang MD *

Advances in Radiation Oncology (2018) 3, 297–304

the radiation field. The spleen is known to serve several functions, including serving as a reservoir for lymphocytes, platelets, and potentially other cell types.⁶

The effects of radiation on the normal functions of the spleen remain largely unknown, and the organ is not routinely designated as an organ at risk with applicable dosimetric constraints. One recent study found a dose-

Table 3 Organ and dosimetry characteristics by severity of hematologic toxicity

Parameter	60 pz GEJ Cancer		HT3+		P-value ^a
	No HT3+	HT3+	Mean	SD	
Baseline spleen volume (cm ³)	299	119	204	85	.002
Percent decrease in spleen volume at first follow-up (%)	22.9	14.5	0.3	30.0	.009
Percent decrease in spleen volume at second follow-up (%)	28.8	19.3	11.6	40.4	.118
Spleen dosimetry					
Mean dose (Gy)	23.8	6.5	22.7	9.2	.593
V5 (cm ³)	276.9	116.5	165.1	82.0	< .001
V10 (cm ³)	247.3	106.8	153.1	77.2	.001
V15 (cm ³)	216.7	104.7	136.5	72.1	.003
V20 (cm ³)	179.2	103.8	105.5	57.5	.004
V30 (cm ³)	92.7	76.0	54.6	41.5	.038
V40 (cm ³)	35.9	32.4	26.2	31.3	.267

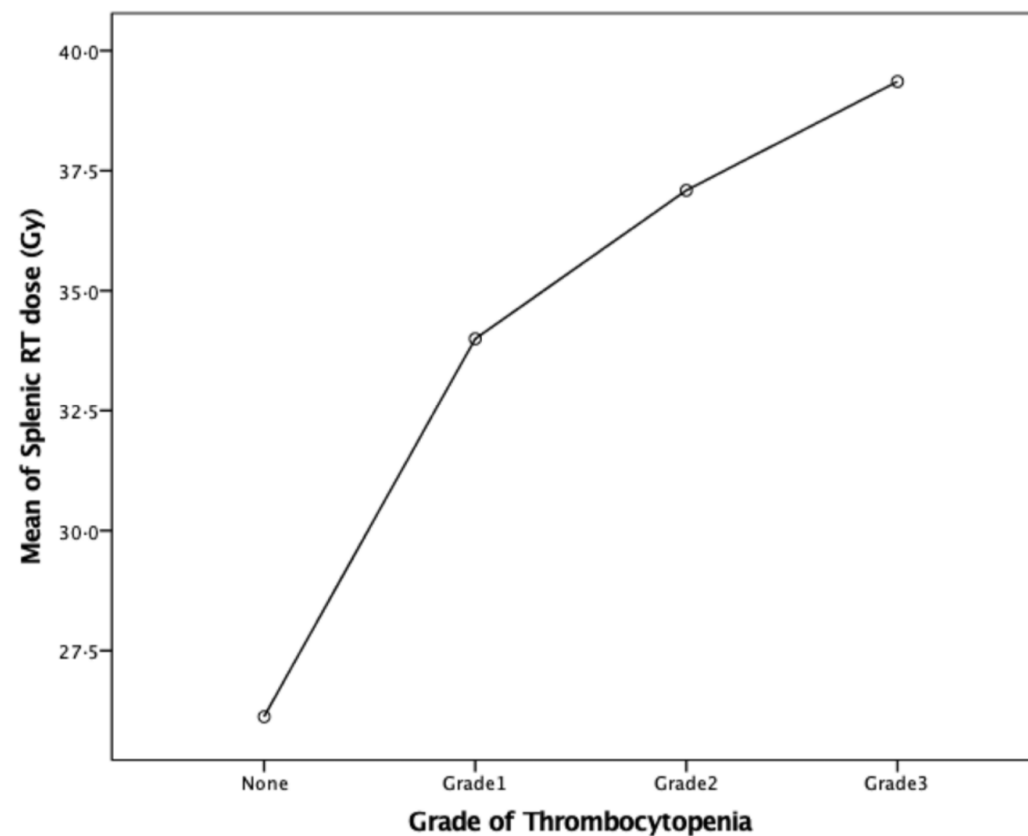
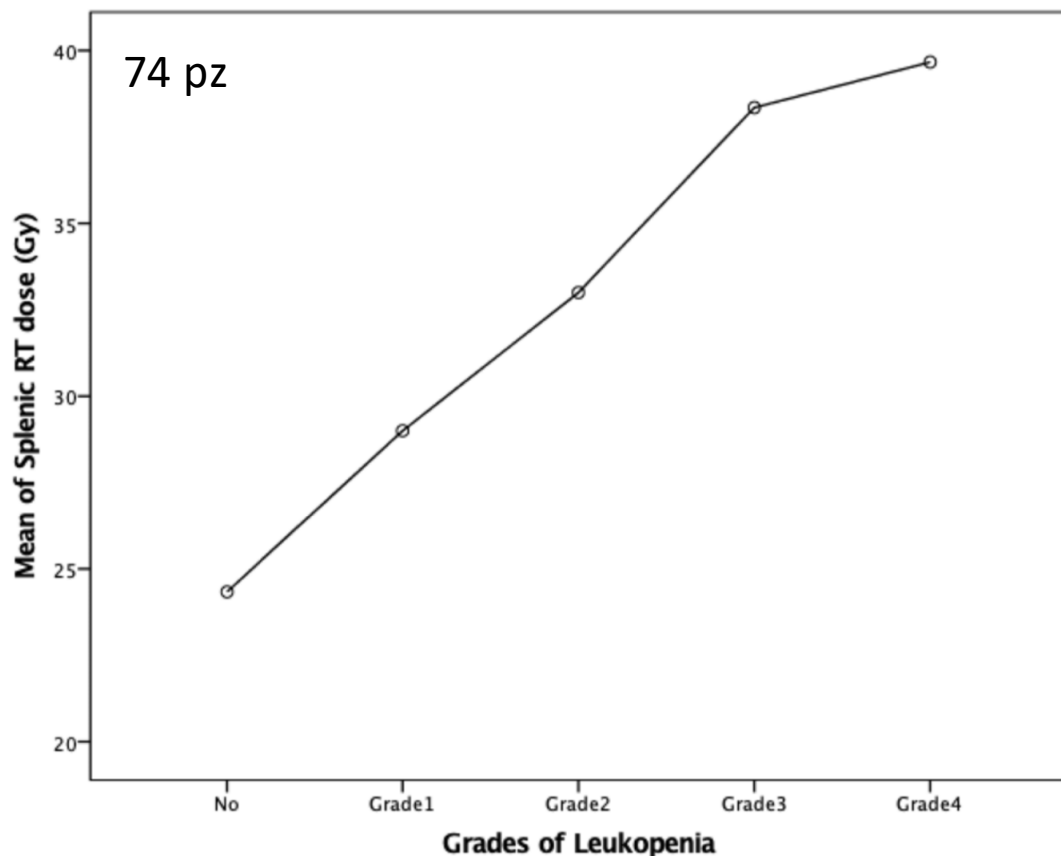
Irradiazione incidentale della Milza nei trattamenti RT dell'alto addome

Spleen as an organ at risk in adjuvant chemoradiotherapy for gastric cancer: a retrospective dosimetric study

Umesh Velu¹, Preethi S. Shetty², Krishna Sharan¹, Shirley Salins¹ and Anshul Singh¹

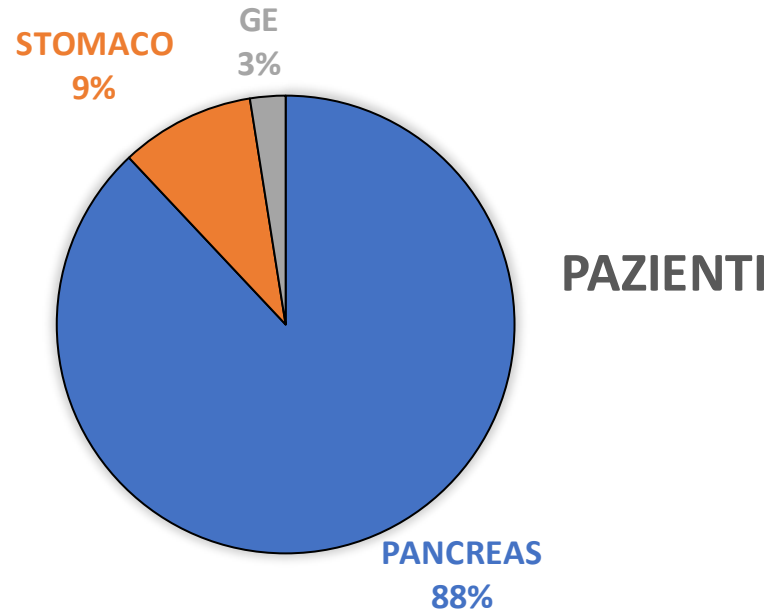
Results: The mean spleen volume was 186.65 cc. The Dmean to the spleen was 35.35 Gy (20–42 Gy). Grade 3 leukopenia was observed in 67%, grade 4 in 15%, and grade 3 thrombocytopenia was noted in 41% of patients. Radiotherapy (RT) dose > 35.5 Gy to the spleen resulted in \geq grade 3 leukopenia. RT dose \geq 36.5 Gy resulted in grade 3 thrombocytopenia. The occurrence of leukopenia and thrombocytopenia was also affected by the location of the primary gastric cancer (higher incidence in distal than in proximal tumours).

Conclusion: The spleen should be considered as an important organs at risk during adjuvant RT for gastric cancer. Dmean to the spleen should be < 35.5 Gy to prevent major haematological toxicities.

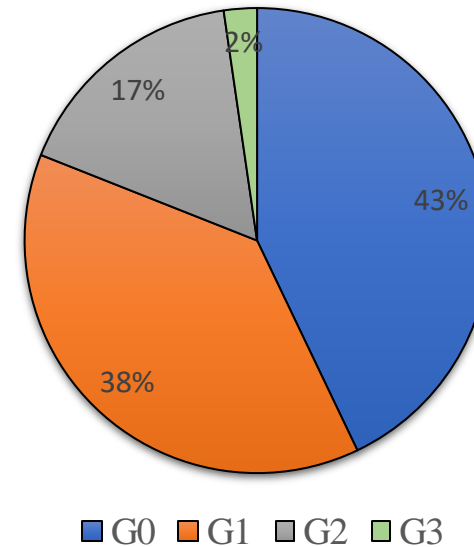


Irradiazione incidentale della Milza nei trattamenti RT dell'alto addome

42 pazienti



TOSSICITA' EMATOLOGICA



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140 . logit LowHigh V5, or
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Iteration 0: log likelihood = -20.450334
Iteration 1: log likelihood = -17.431743
Iteration 2: log likelihood = -17.110123
Iteration 3: log likelihood = -17.107665
Iteration 4: log likelihood = -17.107664
```

Logistic regression

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Number of obs = 42
LR chi2(1) = 6.69
Prob > chi2 = 0.0097
Pseudo R2 = 0.1635
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Log likelihood = -17.107664

LowHigh	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]
v5	1.046967	.0215894	2.23	0.026	1.005497 1.090149
_cons	.0153085	.021931	-2.92	0.004	.0009236 .2537265

CORRELAZIONE SIGNIFICATIVA TRA LA VARIABILE $V5_{Gy}$ DELLA MILZA E LA TOSSICITA' EMATOLOGICA ACUTA, CON SVILUPPO DI EVENTI DI GRADO ≥ 2

Irradiazione incidentale della Milza nei trattamenti RT dell'alto addome

Proposta di studio:

- > Analisi retrospettiva multicentrica: pz sottoposti a RTCT per Ca della GEJ, pancreas, stomaco
- > OBV: valutare eventuale correlazione tra tossicità ematologica acuta e parametri Dosimetrici della milza (irradiazione incidentale)

IPOSTESI DI LAVORO: dati necessari:

- > laboratoristici: GB, Hb, Ptls, Neutrofili, Linfociti
- > Dosimetrici: necessario contornare la milza (se non routinariamente eseguito) e recuperare Dose media, V5, V10, V15, V20, V30, V40, V45;
- > parametri tecnici: dose RT tot e per fr, tecnica RT
- > dati relativi alla CT concomitante a RT

Irradiazione incidentale della Milza nei trattamenti RT dell'alto addome

Si invitano i centri interessati alla proposta di studio a contattare via mail:

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—> eleonora.ferrara@maggioreosp.novara.it

GRAZIE per l'ATTENZIONE!!!!