IRCCS AOU SAN MARTINO IST Genova

CONFRONTO DEI VOLUMI BERSAGLIO IN POSIZIONAMENTO PRONO E SUPINO, NELL'IRRADIAZIONE DELLA PATOLOGIA MAMMARIA:

ESPERIENZA MONO-ISTITUZIONALE.

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PRINCIPLES OF RADIATION THERAPY

Whole Breast Radiation:

Target definition includes the majority of the breast tissue, and is best done by both clinical assessment and CT-based treatment planning. A uniform dose distribution and minimal normal tissue toxicity are the goals and can be accomplished using compensators such as wedges, forward planning using segments, intensity-modulated radiation therapy (IMRT), respiratory gating, or prone positioning. The breast should receive a dose of 45-50 Gy in 1.8-2 Gy per fraction, or 42.5 Gy at 2.66 Gy per fraction. A boost to the tumor bed is recommended in patients at higher risk (age <50 and high-grade disease). This can be achieved with brachytherapy or electron beam or photon fields. Typical doses are 10-16 Gy at 2 Gy/fx. All dose schedules are given 5 days per week.

Krengli et al. Radiation Oncology 2013, 8:232
http://www.ro-journal.com/content/8/1/232

RADIATION ONCOLOGY

RESEARCH Open Access

Prone versus supine position for adjuvant breast radiotherapy: a prospective study in patients with pendulous breasts

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Assenza di differenze statisticamente significative nel volume del CTV prone vs supine

Copertura migliore CTV/PTV per supine setup

Vantaggio per polmone omolaterale in prone setup

Table 2 Comparison of dosimetric parameters from treatment plans obtained in the two setup positions for the whole patients series (41 patients)

	Prone setup	Supine setup	p-value
PTV (cc)	534.9 ± 229.4	515.3 ± 174.2	0.32
V95 (%)	96.5 ± 3.5	98.0 ± 1.6	0.04
V105 (%)	1.4 ± 1.1	2.0 ± 2.5	0.14
V107 (%)	0.1 ± 0.2	0.2 ± 0.5	0.16
Dmin (Gy)	35.8 ± 11.3	35.8 ± 10.2	0.97
Dmax (Gy)	53.7 ± 0.6	53.7 ± 0.6	0.80
Dmean (Gy)	50.1 ± 0.4	50.1 ± 0.3	0.42
CTV (cc)	468.1 ± 216.6	432.0 ± 159.0	0.02
V95 (%)	98.4 ± 2.3	99.3 ± 1.0	0.02
V105 (%)	1.3 ± 1.1	1.8 ± 2.4	0.25
V107 (%)	0.1 ± 0.2	0.1 ± 0.4	0.45
Dmin (Gy)	42.4 ± 7.4	44.4 ± 4.4	0.15
Dmax (Gy)	53.6 ± 0.6	53.5 ± 0.6	0.42
Dmean (Gy)	50.2 ± 0.4	50.2 ± 0.3	0.92
Lung (cc)	1335.0 ± 331.0	1201.0 ± 264.0	$<10^{-6}$
V20 (%)	1.5 ± 1.8	9.0 ± 3.4	$<10^{-6}$
V10 (%)	2.6 ± 2.4	12.7 ± 4.3	$<10^{-6}$
V5 (%)	4.0 ± 3.2	18.4 ± 5.3	$<10^{-6}$
Dmean (Gy)	1.4 ± 0.9	5.2 ± 1.5	$<10^{-6}$
Dmax (Gy)	39.7 ± 12.4	49.5 ± 1.7	$<10^{-5}$

PTV, planning target volume; CTV, clinical target volume.

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Phase III randomised trial

Hypofractionated whole breast irradiation for patients with large breasts: A randomized trial comparing prone and supine positions

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50 Pz RT ipofrazionata con IMRT in setup prono:
2 campi tangenziali

50 Pz RT ipofrazionata con IMRT in setup supino

6 campi

Dose to
(75% pz)

Prone setup migliore conformazione ed omogeneità V105,V107

Prone setup risparmio OARs

Organ	Dose-volume	Treatment group		p-value
		Supine	Prone	
	Coverage (%)	92.7 ± 4.9	96.2 ± 2.2	<0.001
	Homogeneity	0.87 ± 0.04	0.90 ± 0.04	<0.001
	V_{105} (cc)	30.9 ± 40.4	8.9 ± 17.7	<0.001
	V_{107} (cc)	7.6 ± 12.6	0.9 ± 2.7	<0.001
Heart	D_{mean} (Gy)	2.0 ± 1.1	1.5 ± 0.6	0.08
	D_{max} (Gy)	12.1 ± 9.5	9.7 ± 6.5	0.25
	V_5 (%)	5.9 ± 5.5	3.8 ± 3.9	0.09
	V_{20} (%)	1.4 ± 2.3	0.7 ± 0.9	0.12
	D_{mean} (Gy)	9.3 ± 6.5	5.4 ± 3.7	0.007
	D_{max} (Gy)	23.0 ± 11.7	19.5 ± 11.1	0.25
Ipsilateral lung	D_{mean} (Gy)	3.8 ± 1.1	1.1 ± 0.9	<0.001
	D_{max} (Gy)	26.6 ± 6.5	8.6 ± 8.9	<0.001
	V_5 (%)	16.9 ± 5.7	2.9 ± 3.7	<0.001
	V_{20} (%)	5.5 ± 3.3	0.9 ± 2.1	<0.001

ESPERIENZA MONOISTITUZIONALE
IRCCS AOU SAN MARTINO IST Genova

- 45 Pz Marzo 2013-Gennaio 2014
- TC scan in posizione prona e supina
- Dose tot: 39Gy in 13fx + cc boost 3-4Gy (4fx/sett)

  Guenzi M. et al. Radiation Oncology 2010

CRITERI DI INCLUSIONE

- Karnofsky ≥ 80
- Età ≥ 45aa
- Chirurgia conservativa
- Volume mammario TC scan ≥ 500 cc

CRITERI DI ESCLUSIONE

- Sede di malattia su prolungamento ascellare (QSE)
- Sede di malattia particolarmente interna (QSI)
- Parete toracica con/senza espansore
- N+ ≥ 4 → RT SPC

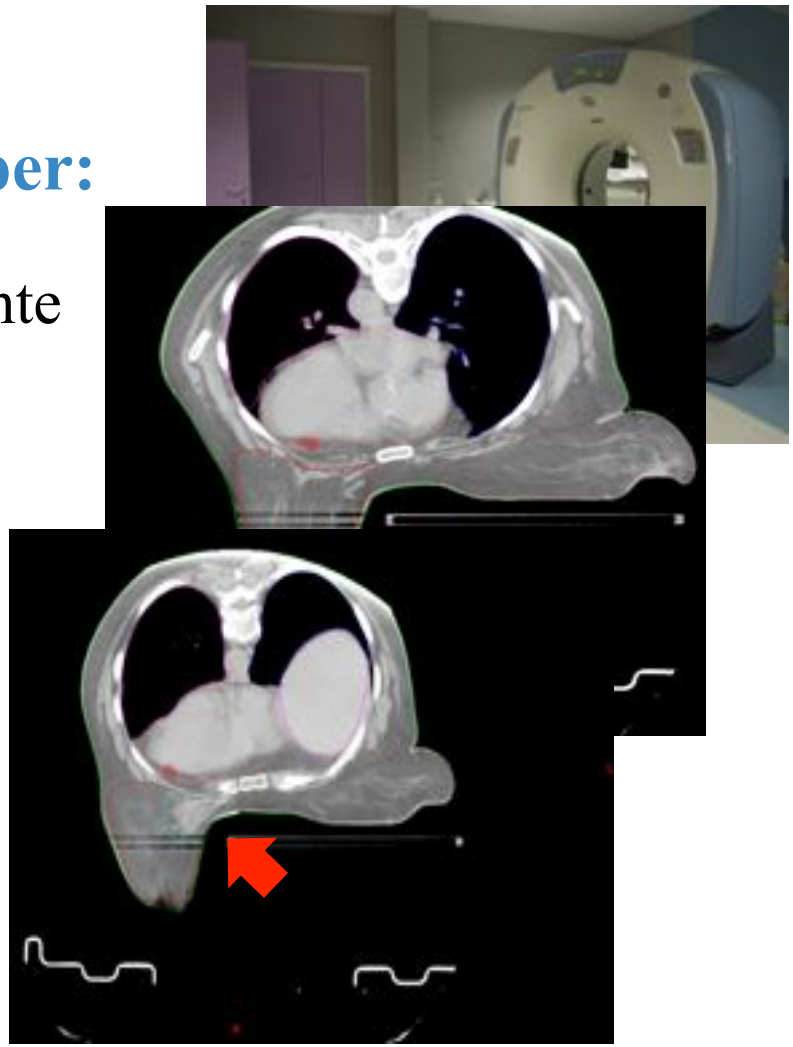
45 Pz Marzo 2013- Gennaio 2014

- **11 Pz(24%) escluse al setup prono per:**

  6 Pz(13%) diametro TC-scan insufficente

  3 Pz(7%) sede di malattia (QSI)

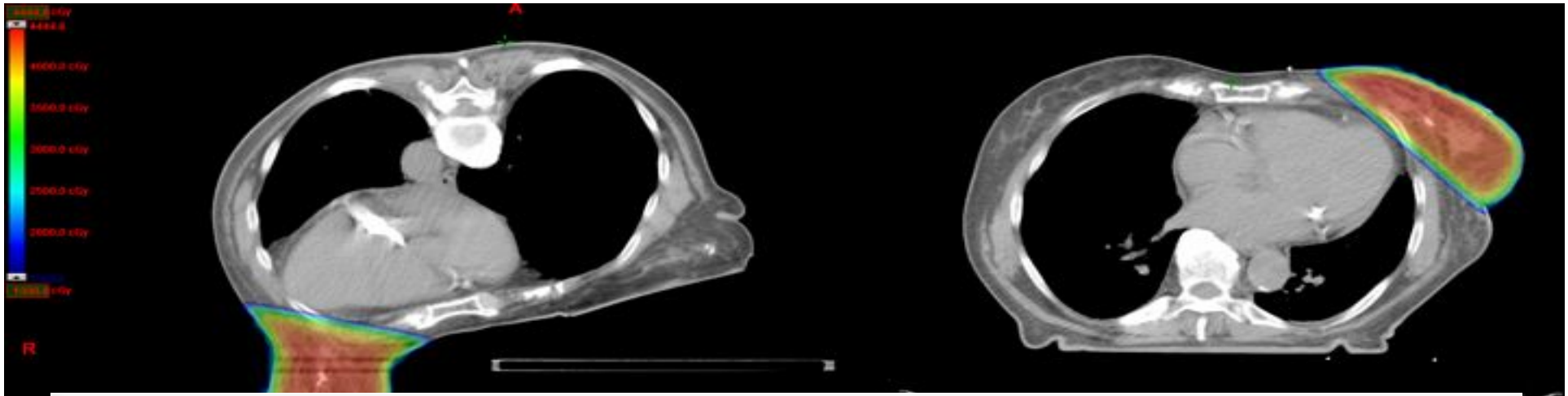
  2 Pz(4%) compliance



- **34 Pz(76%) TC di centraggio con setup prono e supino**


Bionix Prone Breast Treatment System® RT-6025 (AOU SAN MARTINO-GENOVA)
Wing-board position
Repere radiopaco su perimetro mammario/cicatrice chirurgica
4 Tatuaggi di riferimento
Foto

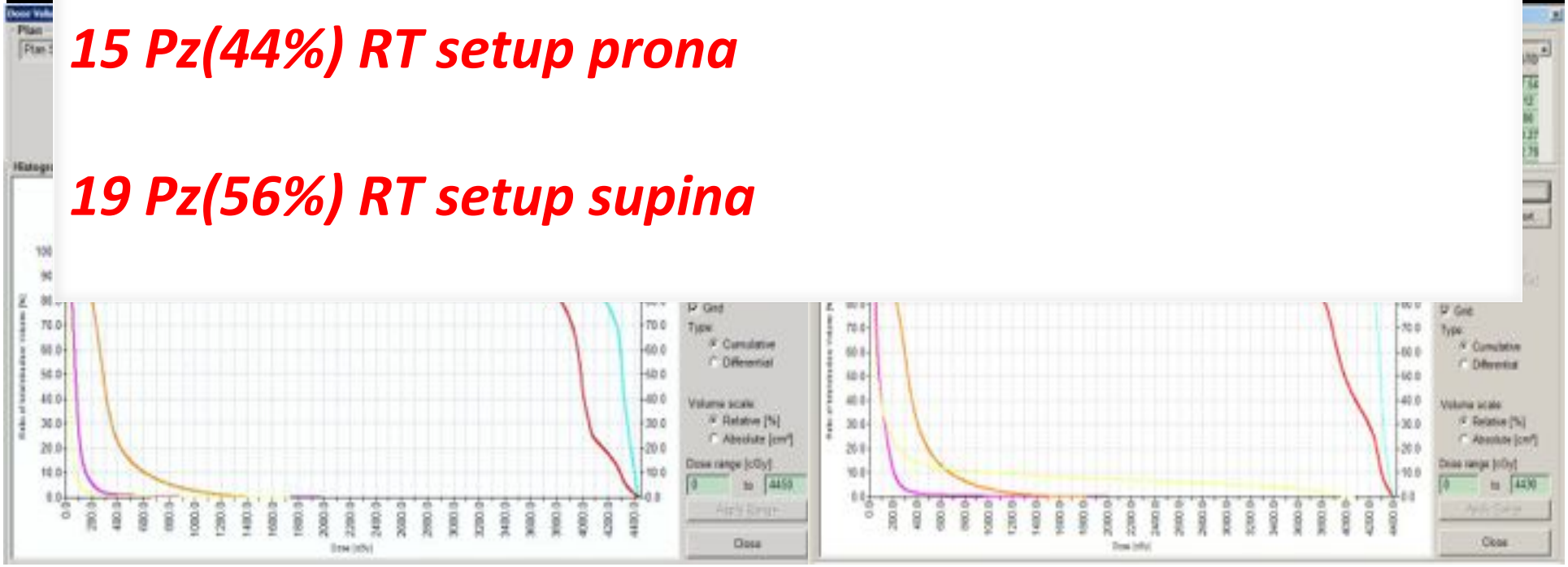

Breast Cancer Atlas for
Radiation Therpy Planning
RTOG
RADIATION THERAPY
ONCOLOGY GROUP



Delle 34 Pz(76%) che hanno eseguito centraggio in setup prono e supino dopo studio dosimetrico dei piani rivali:

15 Pz(44%) RT setup prona

19 Pz(56%) RT setup supina

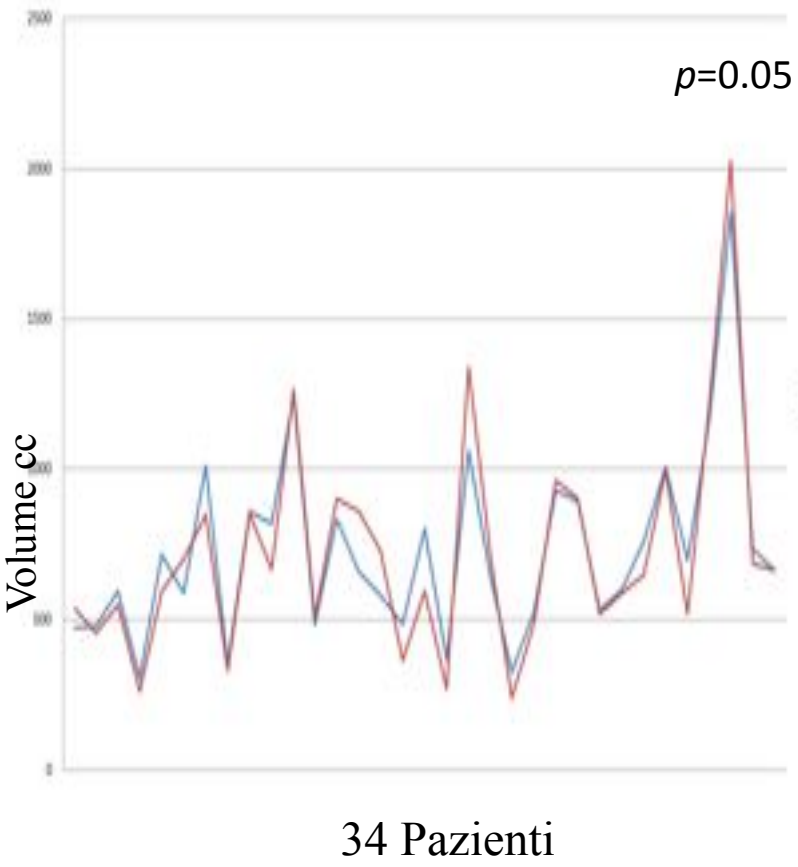


VOLUME BERSAGLIO	PRONE	SUPINE	*p*-value
CTV mammella (cc)	**665.8(240.2-2025.3)**	**680.9(306.6-1885.0)**	**0.05**
V105 (%)	28.9(13.1-60.6)	28.4(7.3-43.6)	0.84
V103 (%)	42.9(26.7-71.2)	44.1(16.5-58.7)	0.65
V100 (%)	69.1(45.8-83.4)	72.8(49.9-89.1)	0.15
V95 (%)	87.9(57.6-95.3)	90.0(72.8-97.7)	0.20
V90 (%)	93.9(62.8-98.8)	92.3(34.3-99.4)	0.46
CTV1 cc boost (cc)	**59.2(20.3-234.6)**	**88.8(21.8-166.6)**	**0.05**
V105 (%)	0,2(0-5.9)	0(0-0.5)	0.36
V100 (%)	76.3(17.2-100.0)	65.6(17.1-97.7)	0.03
V95 (%)	97.8(88.1-100.0)	98.0(78.3-100.0)	0.76

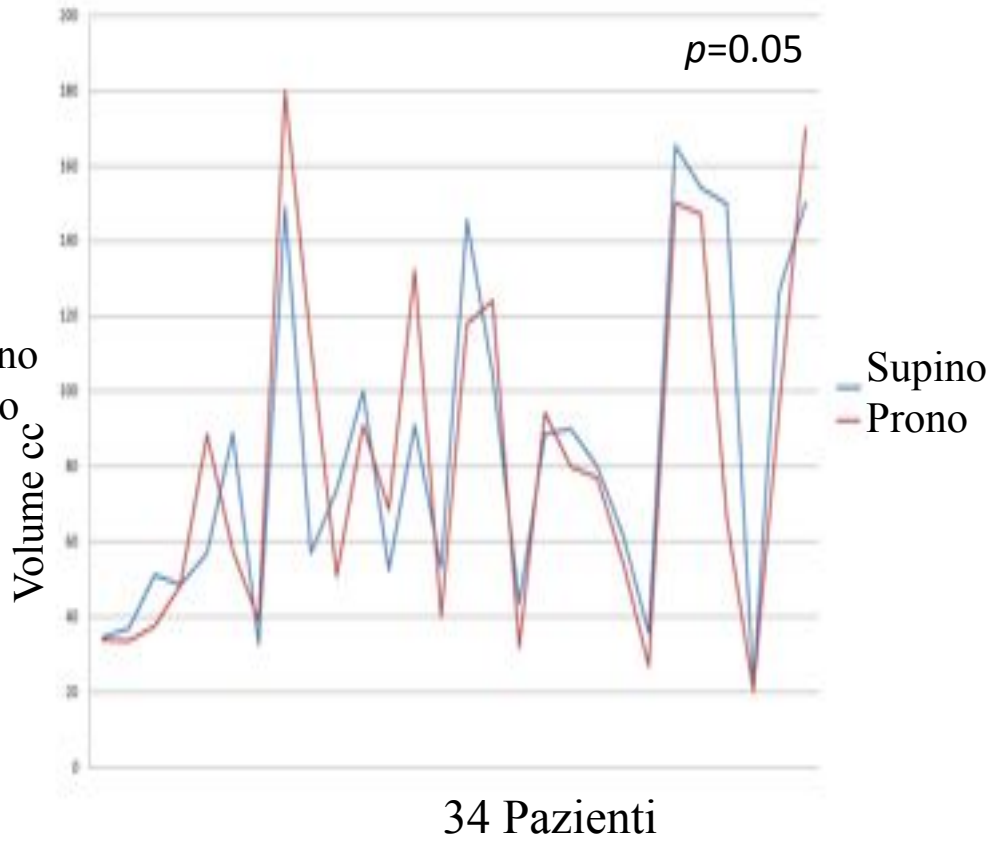
POSIZIONE PREFERITA	PRONA	SUPINA	INDIFFERENTE
N° Pazienti	20Pz (59%)	5Pz(15%)	9Pz (26%)

VARIAZIONI VOLUMI BERSAGLIO

CTV mammella



CTV1 cc boost



TECNICA 3DCRT

- **Mammella (CTV):**

2 Campi tangenti di fotoni 6-15MV ± 1-2 campi ridotti di fotoni 6-15MV

- **Cc boost (CTV1):**

2-3 Campi di fotoni 6-15 MV

- **LADCA**:

V20 2Gy/fx=0 → *V16 3Gy/fx=0*

- **Polmone omolaterale:**

V20 2Gy/fx ≤ 20% → *V16 3Gy/fx ≤ 20%*

CONCLUSIONI

- *Setup prono è una favorevole alternativa in pz con mammella voluminosa e pendula*
- *Necessita di una accurata selezione della paziente*
- *Un attento setup*
- *Curva di apprendimento lunga che interessa medico, fisico, tecnico di radiologia medica*


Cambiare il punto di vista può essere affascinante
senza dover necessariamente cambiare la
sostanza.....!!!!!