Variabilità tra osservatori esperti nella definizione del *Clinical Target Volume* nei linfomi primitivi del mediastino

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INTRODUCTION (1)

- PMBCL is a distinct and uncommon variant of DLBCL arising from thymic B cells *[Martelli M et al, Crit Rev Oncol Hematol, 2008]*

- Standard treatment: R-chemotherapy followed by RT *[Zinzani PL et al, Clin Lymphoma Myeloma, 2009; Vassilakopoulos TP et al, Oncologist, 2012]*

- The need of consolidation RT has been questioned in patients in complete response after R-CT *[Wirth A, Leuk Lymphoma, 2007]*

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INTRODUCTION (2)

Diagnosis PMLBCL
Registration

PET-CT 0

RCHOP 14-21; R-V/MACOP-B
R-EPOCH; R-ACVBP; R m-CHOP

Standard therapy
*R-Chemo

PET-CT 1 (5-6week)
Central review

Positive
DS 3-5

Negative
DS 1-2

Randomized 1:1

Treatment based on
investigator choice
(follow-up for PFS)

IFRT

Observation

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INTRODUCTION (3)

- A great accuracy in the delineation of the Clinical Target Volume (CTV) is crucial

- Imaging interpretation may be very different when there is mediastinal lymph nodes involvement in lung cancer and in Hodgkin's lymphoma *[Cascade PN et al, 1998; Fletcher BD et al, 1999]*

- Interobserver variability in the delineation of GTV, CTV and PTV is a very significant problem in RT planning *[Steenbakkers RJHM et al, 2005; Weiss E et al, 2003; Lammering G et al, 2010; Genovesi D et al, 2011]*

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INTRODUCTION (4)

- Definition of all initially involved disease sites, using information from both pre-chemotherapy CT and PET/CT

- **CTV**: initial volume of the mediastinal mass taking into account response to chemotherapy and displacement of normal structures

- **PTV**: CTV with margins to take into account organ motion and set-up variations

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PURPOSE

The aim of this study was to assess the interobserver variability in CTV definition in a case of PMBCL

During a meeting of the RT committee of the Fondazione Italiana Linfomi (FIL), the Radiation Oncology of the University of Turin proposed a multi-institutional contouring of a case of PMBCL

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MATERIALS AND METHODS
Clinical case

G. F., male, 56 years old

- Hernioplasty at young age
- Pollen allergy

Appearance of left parasternal swelling, cough and dyspnea

Chest X-ray: mediastinal widening associated with bilateral pleural effusions

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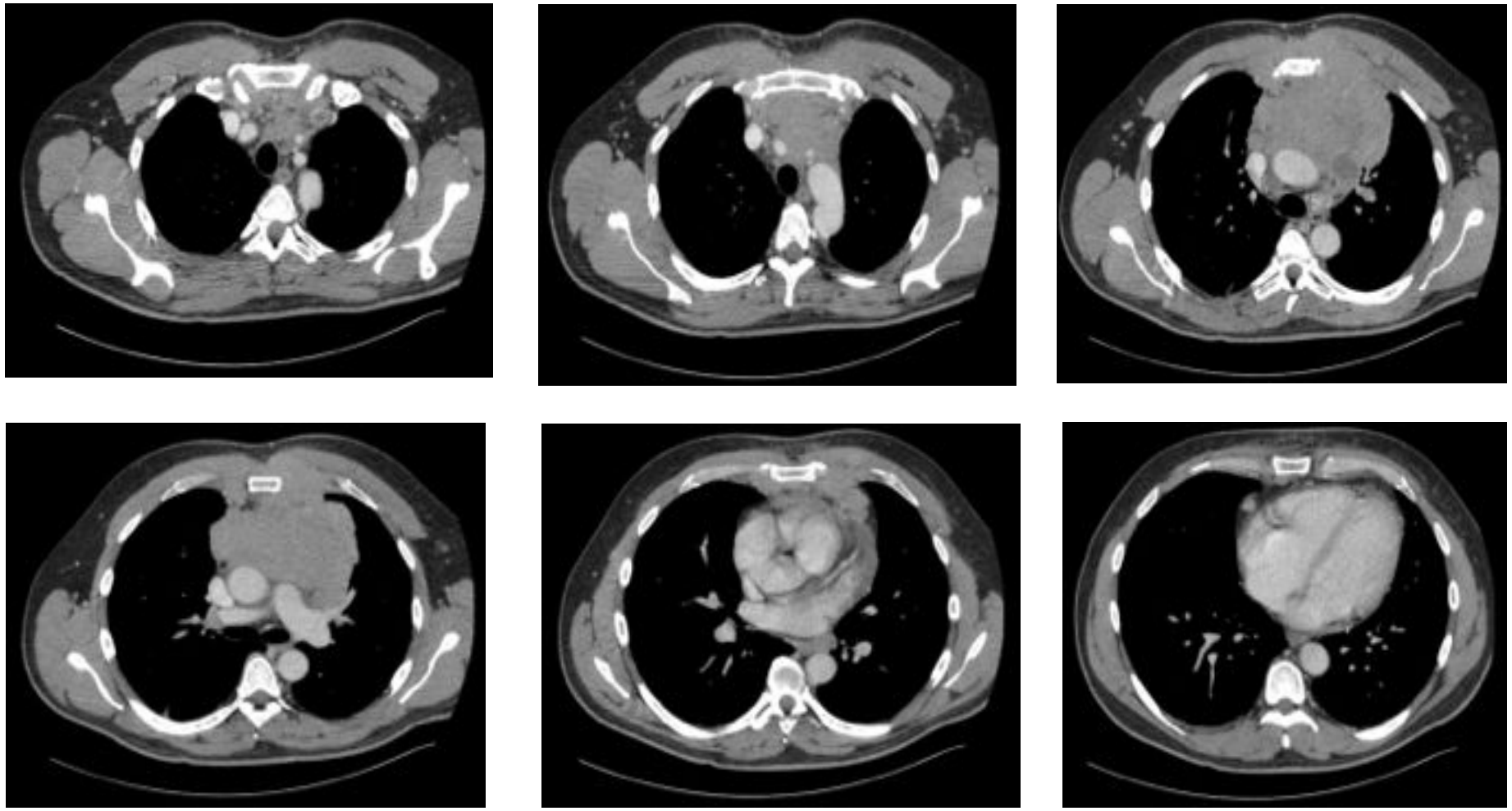
MATERIALS AND METHODS

Clinical case



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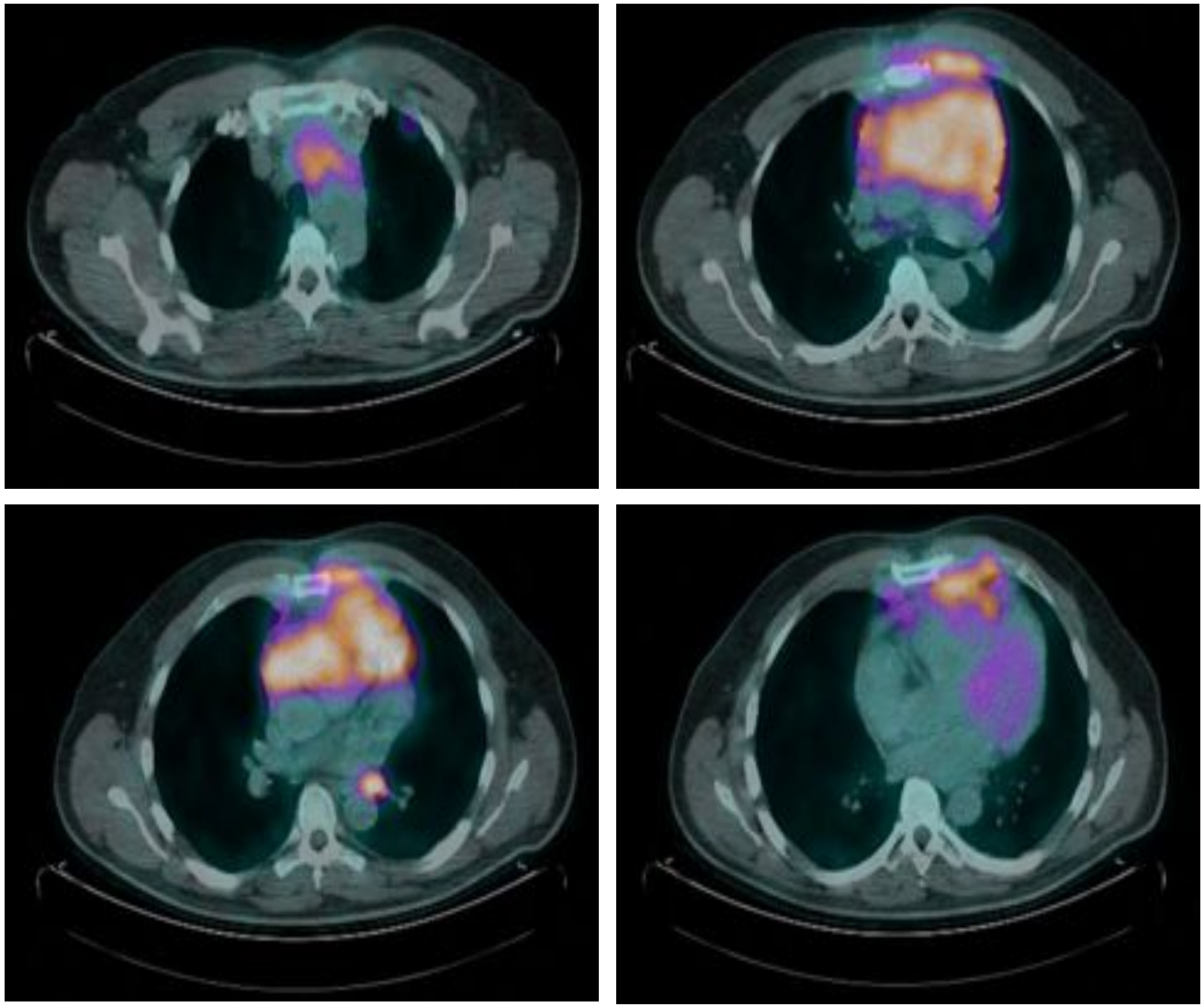
MATERIALS AND METHODS

Clinical case



Needle biopsy:
Primary Mediastinal
B Cell Lymphoma

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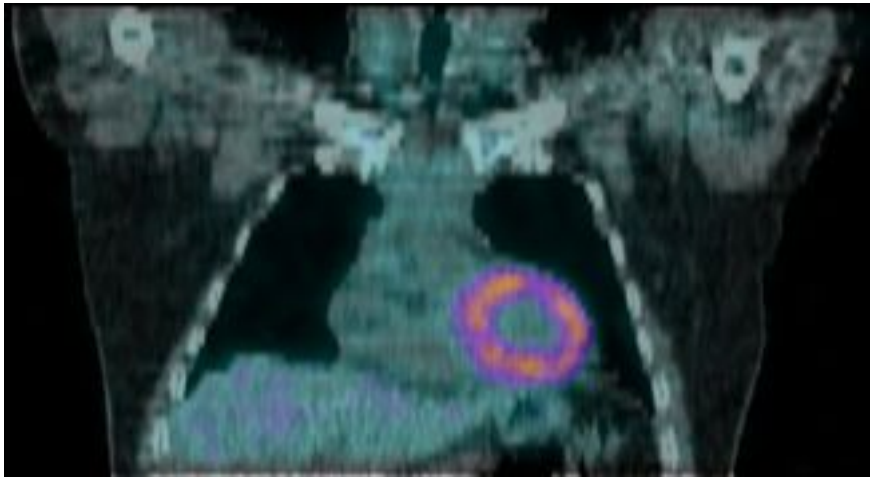
MATERIALS AND METHODS

Clinical case

The patient was enrolled in the IELSG37 protocol
Chemotherapy according **R-CHOP14**, for a total of **6 cycles**



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MATERIALS AND METHODS
Workshop - Contouring

- 10 observers

- Target volume definition

  CTV: the initial volume of the mediastinal mass at presentation taking into account response to chemotherapy and displacement of normal structures

- Information from pre and post-chemotherapy CT and PET/CT

- Image fusion and target definition by VelocityAI software

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MATERIALS AND METHODS
Data Analysis

- **CTVs volume**

- **Maximum diameters**
  craniocaudal
  anteroposterior
  laterolateral

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MATERIALS AND METHODS
Data Analysis

Considering CTVref the one with the best Dice Similarity Coefficient (DSC) between a volume resulting from the union of all CTVs and individual CTV:

- **DSC for each volume compared to CTVref**
  - *DSC 0 indicates no agreement between the observers*
  - *DSC 1 represents 100% concordance*

- **Hausdorff Distance (HD) for each volume compared to CTVref**
  - *A mathematical construct to measure the "closeness" of two sets of points*
  - *It determines the maximum of all the distances from points on one structure to the closest point on the other structure*
  - *Low values of HD indicate no outlier points on the comparing structures*

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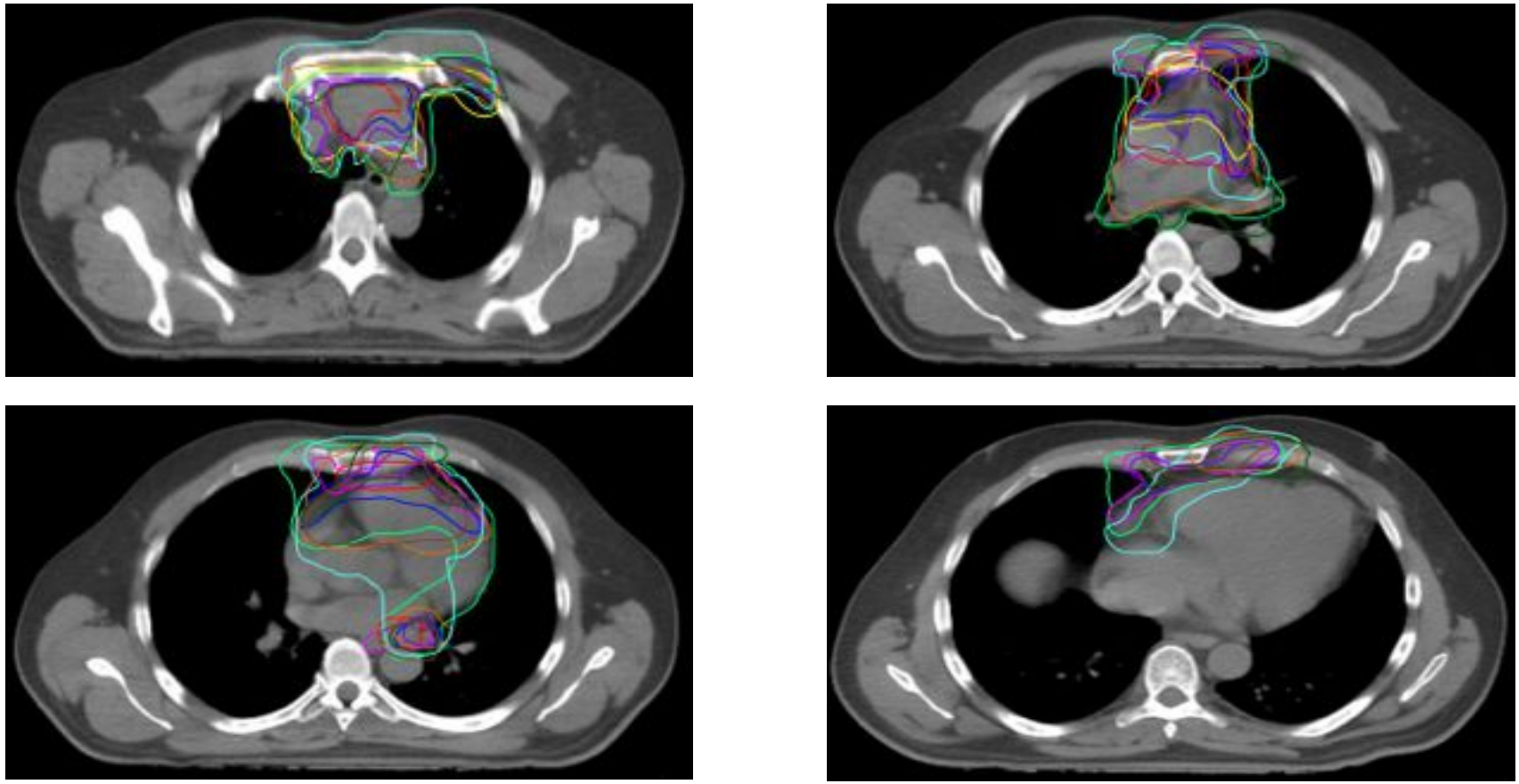
RESULTS (1)



Graphic representation of interobserver variability in CTV definition by all observers

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RESULTS (2)

Statistics	Volume (cc)	Craniocaudal diameter (mm)	Anteroposterior diameter (mm)	Laterolateral diameter (mm)
N	10	10	10	10
Mean	498.3	132.7	132.6	126.2
Standard deviation	285.5	24.9	18.9	21.6
Minimum	181.8	80.6	84	83.7
Maximum	1003	159	150.5	149.5
Median	430.4	144.7	136.2	133.5

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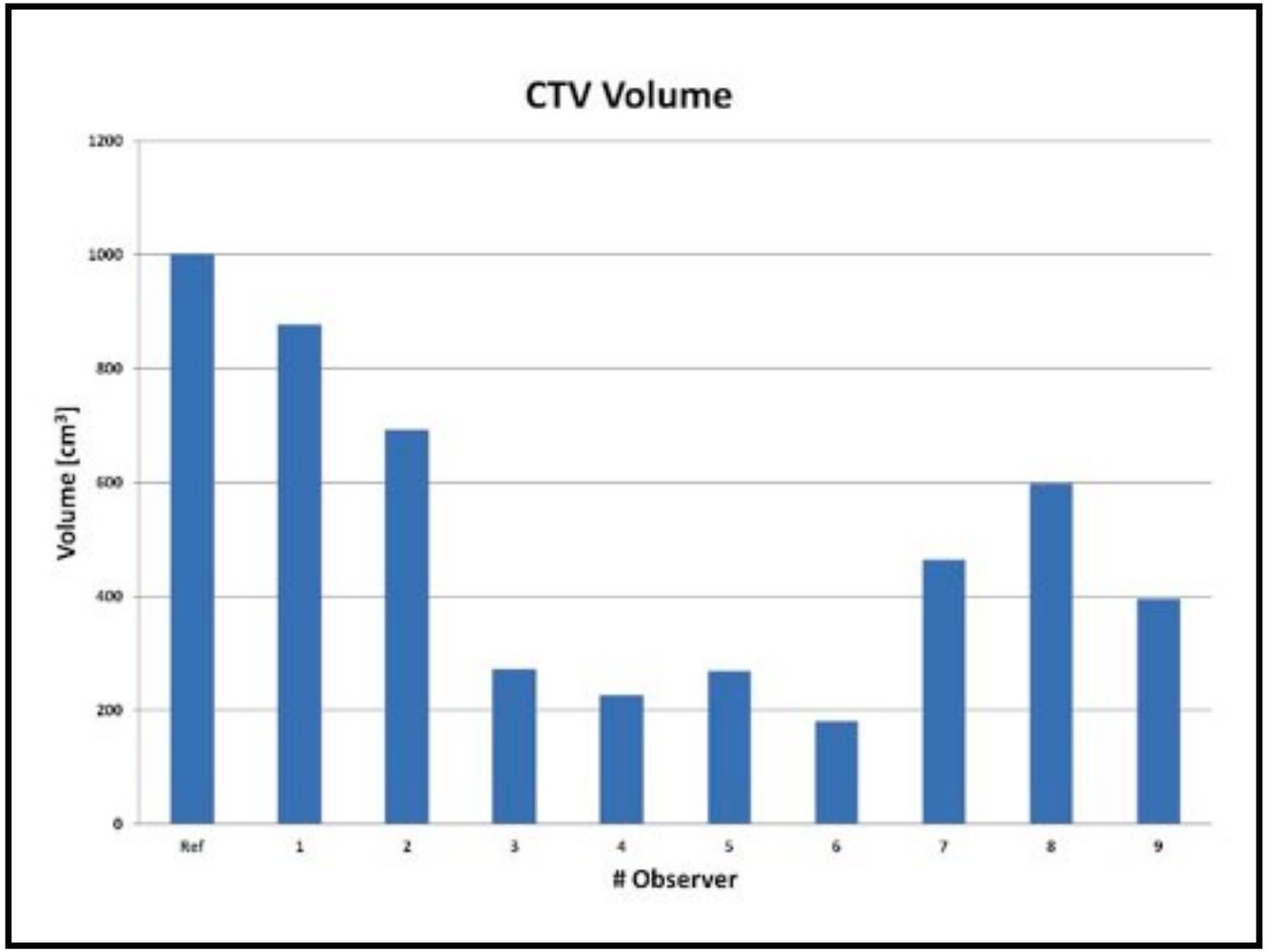
RESULTS (2)



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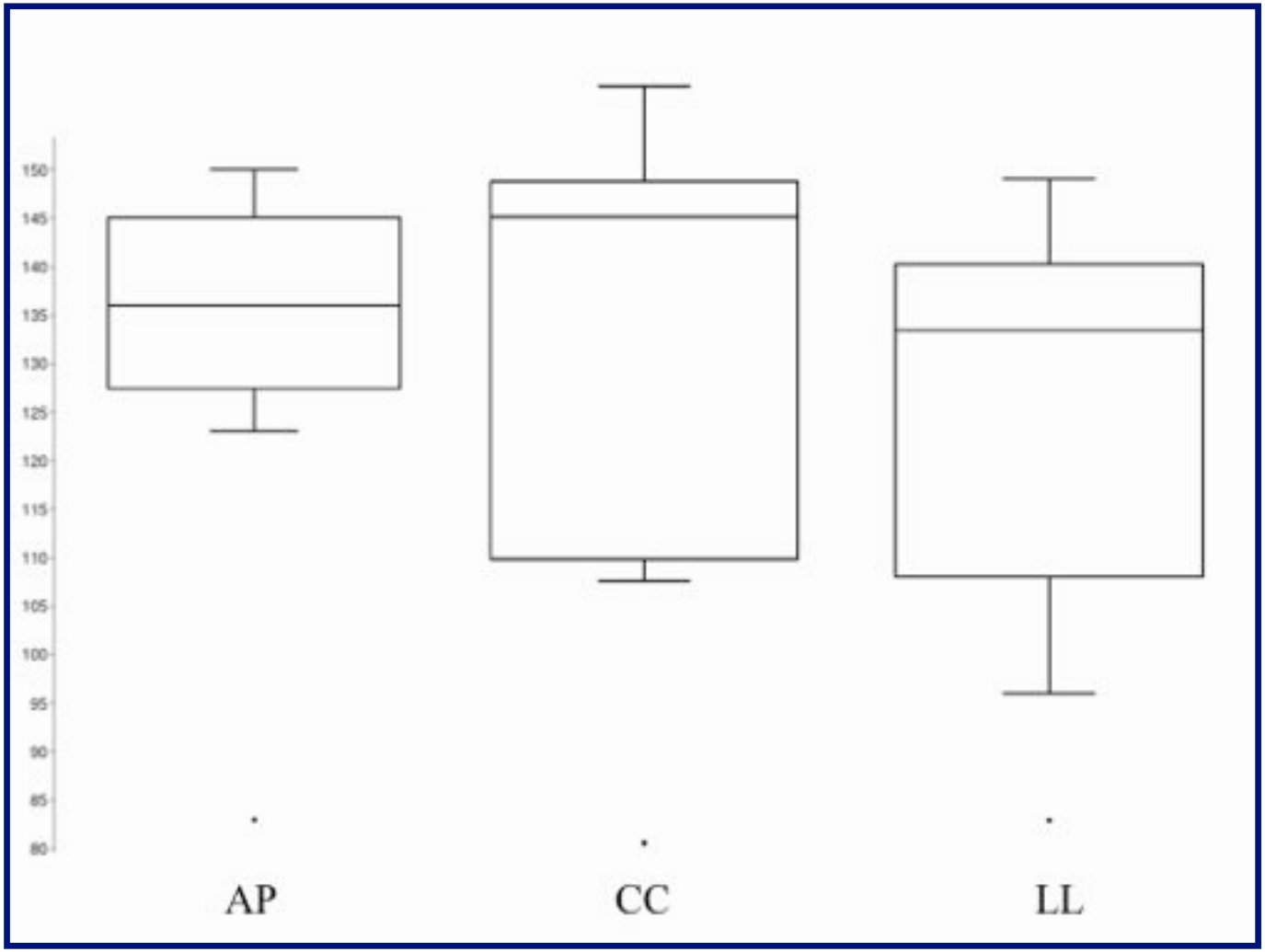

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RESULTS (4)

Observer	DSC	HD
1	0.72	1.8
2	0.74	1.9
3	0.39	14.8
4	0.37	6.9
5	0.42	9.2
6	0.31	12.1
7	0.59	4.5
8	0.67	2.4
9	0.54	3.5
Mean	0.53	6.4

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CONCLUSION

Results of our multi-institutional study show great variability in CTV definition among radiation oncologists from different institutions in all parameters (volume, diameters, DSC, HD)

This findings affirm the need of specific guidelines, accurate knowledge and experience in lymph node delineation when planning consolidative RT in PMBCL

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Grazie per l'attenzione…

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