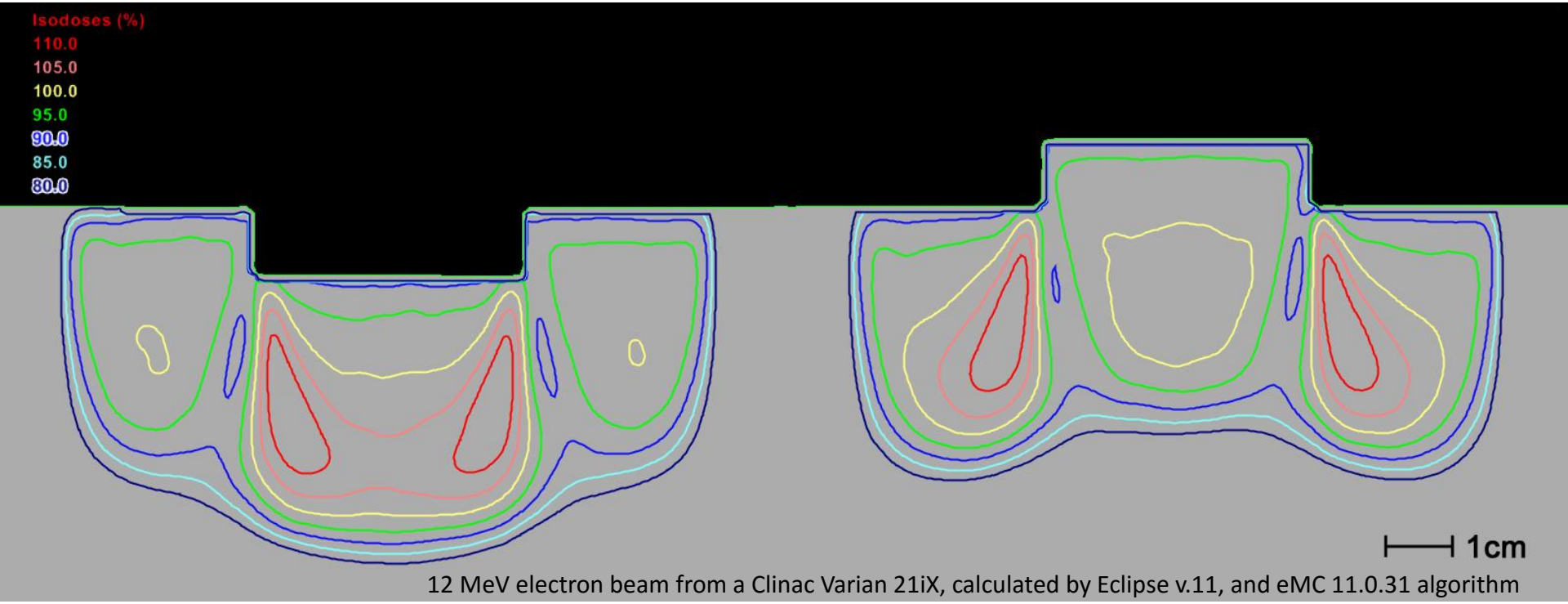
NEW USES HYDROGEL AS COMPENSATION BOLUS AND TO FILL AIR

Hospital Clínico Universitario de Valladolid, SPAIN

H. Perez-Garcia
A. del Castillo
D. Miguel
C. Andrés
M. Agulla
D. Alonso
J.de Frutos
C.Pérez
R. Torres

1 Introducción

Electron beams over an irregular surface produce localized hot and cold spots in the underlying medium due to scattering. This fact usually reduces the quality of the treatments.



12 MeV electron beam from a Clinac Varian 21iX, calculated by Eclipse v.11, and eMC 11.0.31 algorithm

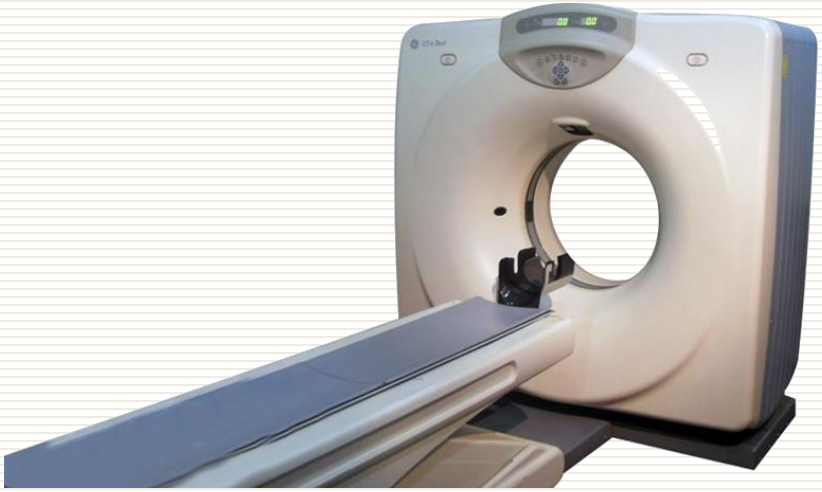
In practice, such sharp dose edges may be smoothed with an appropriately shaped bolus.

The purpose of this paper is to present hydrogel (by Varihesive® ConvaTec) as a compensation bolus for clinical treatments

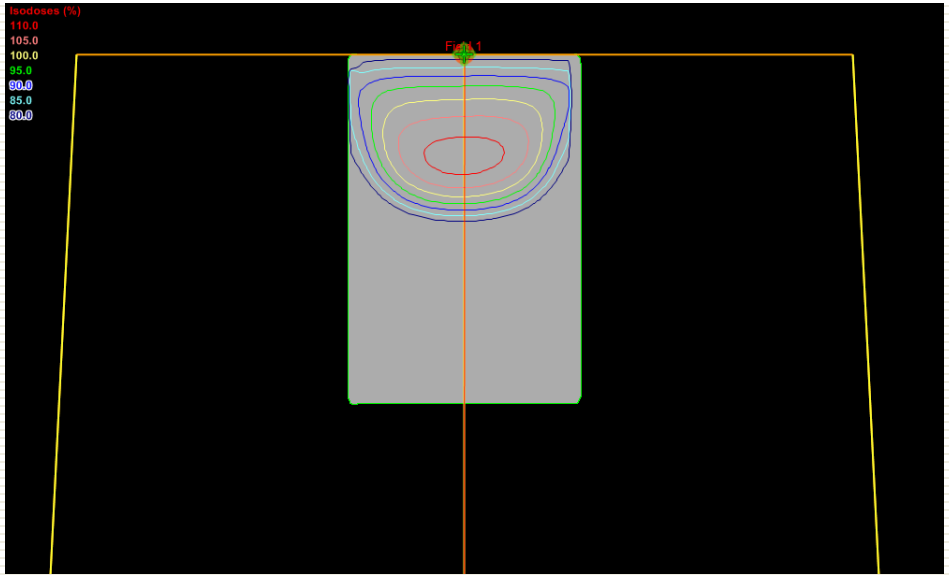
The hydrogel is a polymer with the ability to absorb large amounts of water without dissolving and it presents a viscous gel consistency and moldable

2 Materials and Methods

Hydrogel material is radiologically characterized by a CT images using a clinical TC GE HiSpeed Nx/I.

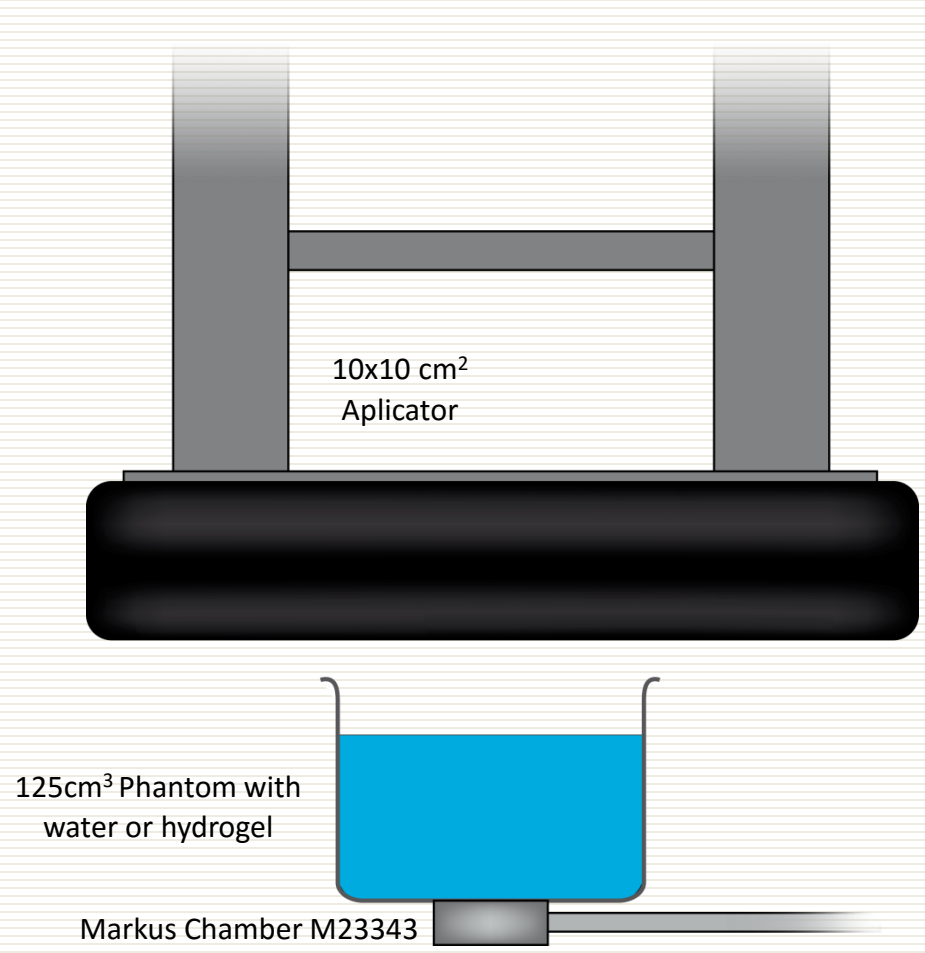


Hounsfield Units are measured



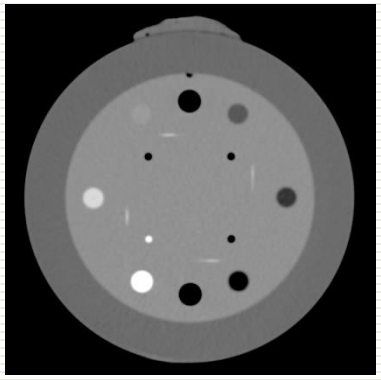
Percentage Depth Dose (PDD) is predicted by Eclipse TPS using the Analitytical Anisotropic Algorithm (AAA) v.11.0.31 in water and hydrogel.

PDD is measured in water and hydrogel with a Markus chamber (PTW) and compared with previous results (characterized HU to Electronic Density calibration curves were needed).

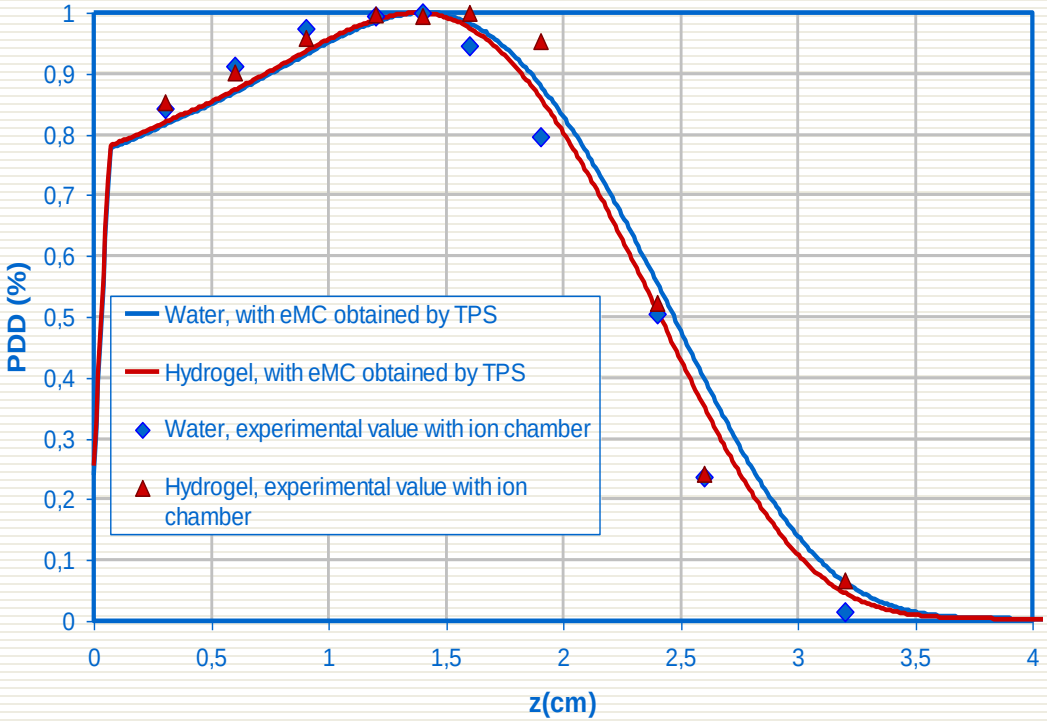


Finally, a practical case of hydrogel use is shown in a vulva cancer treatment: filling skin folds

3 Results



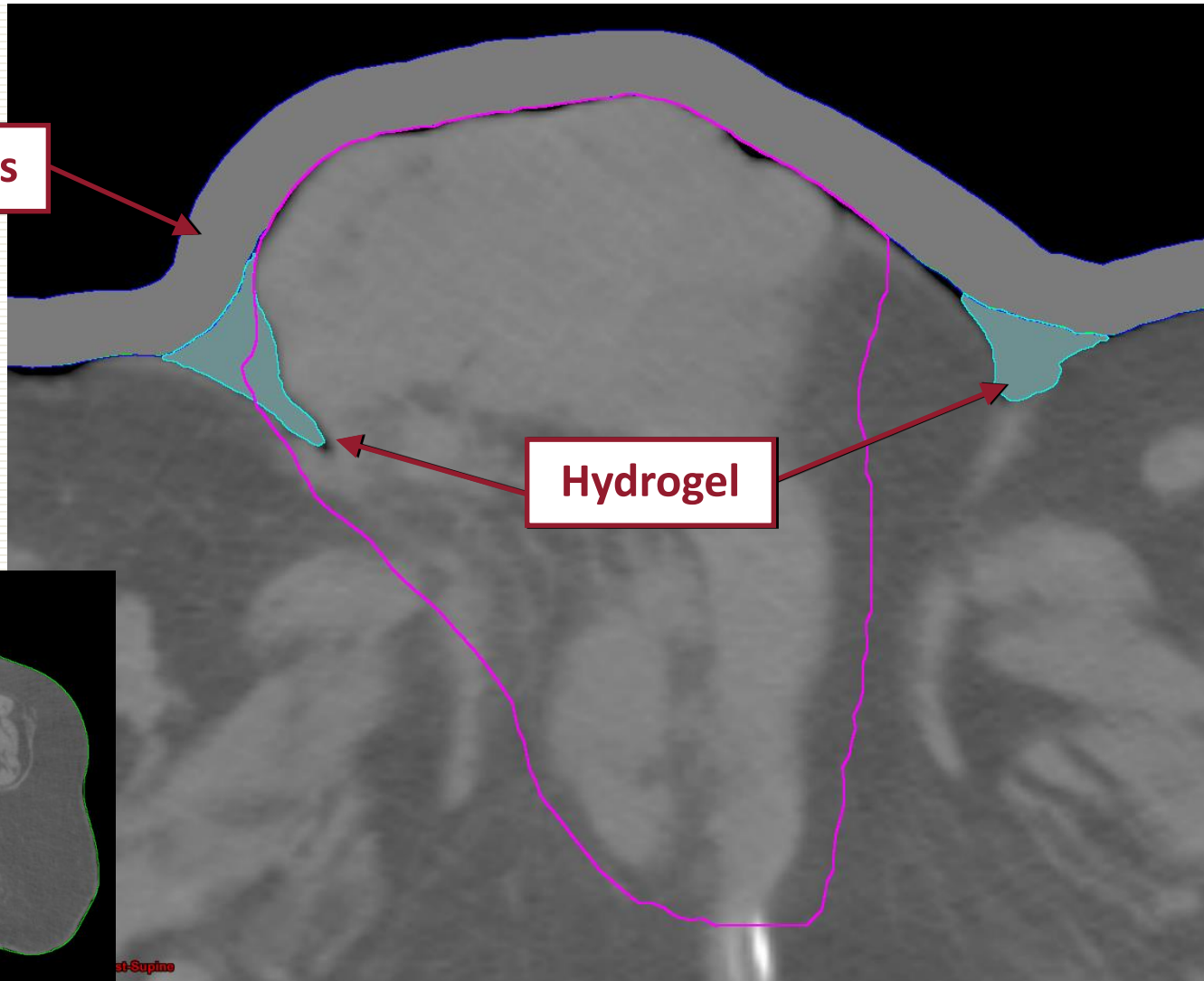
CT Number (HU)	17.5 ± 1.0
Mass density (g/cm³)	1.0304 ± 0.0013
Relative electron density	1.0074 ± 0.0013

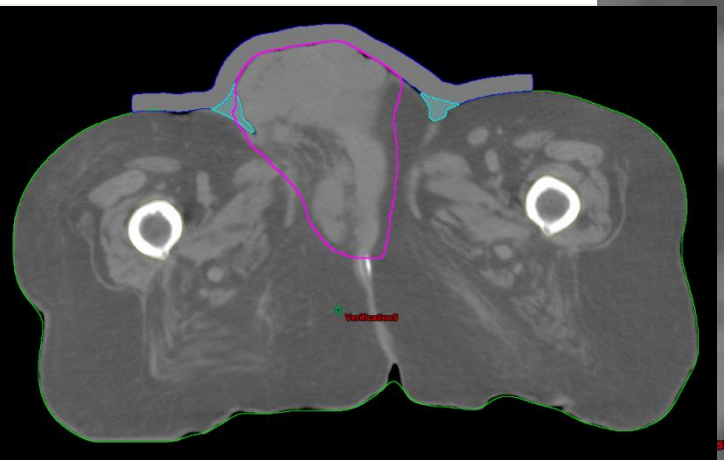


Measured PDD and calculated PDD are very similar to each other.

Obtained results show hydrogel and water have equivalent dosimetric properties.

In the clinical case analyzed, hydrogel is shaped to the curvature of the patient's skin where the conventional laminar bolus is not able to cover.





4 Conclusion

It has been shown that Hydrogel and water are radiological equivalent materials by using:

- CT scaner

- Percentage Depth Dose

Hydrogel can be used as a compensation bolus or to fill air cavities.