Supplementary material for Bouzid D. et al. Monte-Carlo dosimetry for intraoperative radiotherapy using a low energy x-ray source, Acta Oncologica, 2015, doi: 10.3109/0284186X.2015.1016623

Supplementary Figure 1. X-ray source (courtesy of Zeiss-Meditec, Oberkochen Germany): consisting of a 100 mm long, 3.2 mm diameter tube that is attached to a larger housing, containing an electron gun and associated electronics. The tube is made primarily of molybdenum, except for the final 20 mm made of beryllium acting as a transparent x-ray window. The blue concentric rings represent the isotropic distribution of the dose. The probe is coated with a thin layer of chromium nitride (1 μm) in order to render the device biocompatible.

Supplementary Figure 2. Water phantom used for the DDC and isotropy measurements (Courtesy of Zeiss-Meditec, Oberkochen, Germany). This phantom consists of a sealed water tank ($216 \times 217 \times 166 \text{ mm}^3$). It allows the accurate positioning of the source tip (or applicator) above or next to ionization chambers that can be inserted in two measuring compartments made of PMMA located on two orthogonal directions (X-Y and Z planes).

Supplementary Table I. Estimation of measurements and calculations uncertainties for the study. Generic uncertainty assessments have been performed for experimental measurements using IC and TLDs, and MC methods for radiation transport calculations. Type A and B correspond to statistical and systematic uncertainties, respectively. All values provide are for 1σ .

Category		Typical level (%)	
Experimental uncertainties	Ionization chamber (manufacturer's data)		
	Calibration factor N_s of the water tank's ionization chamber	2.0	
	Unidos electrometer	0.5	
	Uncertainty caused by the design tolerance of the IC (20 mm depth in water)	2.0	
	Difference in beam quality of the XRS (IC + XRS)	0.6	
	Conversion factor for IC into absorbed dose to water	1.5	
	Waterproof holder of the IC	0.5	
	General errors caused by measurements in water	2.0	
	Minimum uncertainty in the determination of absorbed dose to water at 20 mm depth in water according to AAPM TG 61	4.2	
	The determination of water energy dose at different water depth	3.0	
MC uncertainties	Minimum uncertainty in the determination of absorbed dose to water of a dose depth curve in water at a specific location z according to AAPM TG 61	5.3	
	TLD	Type A	Type B
	Repeated measurements	1.5	
	Calibration		3.0
	Source strength		2.0
	Lack of backscatter	5.0	
	TLD position on skin		10.0
	Quadrature sum	1.6	13.2
	Total TLD uncertainties	13.3	
	MC Statistics	0.5	
XRS / Applicator geometry		3.2	
Source energy spectrum		1.0	
Quadrature sum	0.5	3.4	
Total MC uncertainties	3.4		