

Karakterisasi detektor pada pengukuran dosis lapangan kecil: kasus IMRT dan SBRT kanker paru = Detector characterization in small field: dose measurement imrt and sbrt lung cancer case

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Abstrak

[Teknik radioterapi lapangan kecil memiliki tingkat kerumitan yang tinggi, karena keberhasilan pelaksanaan terapi menggunakan teknik ini sangat bergantung pada keakuratan proses mulai dari perencanaan, pemberian dosis selama terapi hingga evaluasi pengukuran dosis terapi. Penelitian ini dilakukan pada kasus kanker paru menggunakan teknik lapangan kecil pada kasus teknik IMRT dan SBRT dimana evaluasi dosis dilakukan dengan menggunakan bilik ionisasi, TLD, dan film gafchromic EBT2. Nilai diskrepansi yang didapatkan pada teknik IMRT menggunakan film memiliki nilai yang paling kecil diantara dosimeter lainnya yaitu berada pada rentang nilai 1,75% ~ -0,60%. Pengukuran SBRT baik pada RSCM maupun RSGP hasil yang ditunjukkan PTW 300013 menunjukkan nilai diskrepansi yang tinggi yaitu pada rentang -7,08% ~ -14,98%. Berbanding terbalik dengan PTW 300013, dosimeter Exradine A16 menunjukkan nilai diskrepansi yang kecil yaitu -2,96% ~ -4,12%. Hasil evaluasi film menggunakan MATLAB pada teknik IMRT menghasilkan nilai dosis terukur ≥ 4% lebih tinggi dibandingkan dengan film QAProTM. Sedangkan untuk nilai SBRT dosis terukur yang dihasilkan oleh MATLAB ≤ 4% lebih rendah dibandingkan film QAProTM. Hasil evaluasi dosis dari bilik ionisasi baik pada pengukuran langsung maupun evaluasi menggunakan MATLAB menunjukkan pola yang serupa, yaitu bernilai overestimate pada IMRT dan underestimate pada SBRT. Small field radiotherapy techniques have a high level of complexity, due to the successful of this implementation is highly dependent on the accuracy of the process from planning until evaluating the dose measurement. This research was done in the case of lung cancer using small field radiotherapy by using IMRT and SBRT technique. The dose evaluation is done by using ionization chambers, TLD, and the gafchromic EBT2 film. Results of discrepancy value in IMRT techniques using film has the smallest value among other dosimeters, in range 1.75% to -0.60%. PTW 300 013 shows a high value of discrepancies on the SBRT measurement, in the range of -7.08% to -14.98%. In contrast with PTW300013, Exradine A16 shows a low value of discrepancies, in range -2,96% to -4,12%. Results of film evaluation using MATLAB, IMRT technique have measurable dose value 4% higher than the film QAProTM. Dose discrepancy of SBRT technique that generated by MATLAB 4% lower than the film QAProTM. The Results of dose evaluation using ionization chamber both of measurement and MATLAB evaluation showed a similar pattern, which is have the overestimate value in IMRT and underestimate value in SBRT., Small field radiotherapy techniques have a high level of complexity, due to the successful of this implementation is highly dependent on the accuracy of the process from planning until evaluating the dose measurement. This research was done in the case of lung cancer using small field radiotherapy by using IMRT and SBRT technique. The dose evaluation is done by using ionization chambers, TLD, and the gafchromic EBT2 film. Results of discrepancy value in IMRT techniques using film has the smallest value among other dosimeters, in range 1.75% to -0.60%. PTW 300 013 shows a high value of discrepancies on the SBRT measurement, in the range of -7.08% to -14.98%. In contrast with PTW300013, Exradine A16 shows a low value of discrepancies, in range -2,96% to -4,12%. Results of film evaluation using MATLAB,

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