Verifikasi dosimetri radioterapi teknik VMAT dan IMRT pada kasus kanker prostat = Dosimetry verification on VMAT and IMRT radiotherapy techniques in cases of prostate cancer / Ahmad Maulana

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Abstrak

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Telah dilakukan verifikasi dosis organ target dan jaringan sehat di sekitar target dengan menempatkan TLD Rod LiF100 dan film Gafchromic EBT2 di lubang slab bagian pelvis dari phantom Rando Alderson untuk simulasi kanker prostat. TLD dievaluasi menggunakan TLD Reader Harshaw, sementara Film Gafchromic EBT2 dipindai menggunakan scanner Epson Perfection V700 dengan mode transmisi, red channel dan resolusi 72 dpi. Pengukuran dosis titik dilakukan dengan membandingkan antara dosis yang direncanakan TPS Eclipse ver. 11 dan dosis yang diukur pada target organ target dan organ beresiko menggunakan teknik IMRT dan VMAT. Hasilnya adalah deviasi dosis pada organ target menggunakan teknik IMRT dan VMAT adalah kurang dari 5%. Demikian pula, deviasi dosis pada bladder dan rectum untuk kedua teknik juga kurang dari 5% karena posisinya sangat dekat dengan target volume. Di sisi lain, deviasi dosis di femoral head lebih dari 5% untuk kedua teknik karena lokasinya pada gradien dosis rendah. Selanjutnya, deviasi dosis organ target untuk teknik IMRT cenderung lebih kecil dari teknik VMAT baik untuk TLD dan Film. Perbedaan dosis pada dosis titik organ target antara IMRT dan VMAT kurang dari 1% tetapi terjadi pada dosis yang random untuk organ beresiko. Adapun dosis permukaan pada teknik IMRT cenderung lebih kecil dari teknik VMAT jika kita menggunakan TLD, tetapi dosis pada film EBT2 cenderung sama antara teknik IMRT dan VMAT.
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ABSTRACT
Have been done the dose verification of the target and healthy tissues around by placing the TLD Rod LiF100 and EBT2 Gafchromic film at slab hole of pelvic part of the Alderson Rando phantom for prostate cancer simulation. The Exposed TLDs was evaluated using the TLD Reader Harshaw, while Gafchromic Film EBT2 was scanned using Epson Perfection V700 scanner with transmission mode, red channel and resolution 72 dpi. The point dose measurements were compared between planned dose TPS Eclipse ver. 11 and measured dose at target volume organ and organ at risk for IMRT and VMAT techniques. The result is the dose difference at target volume for IMRT and VMAT are less than 5%. Similarly, the dose difference at Bladder and Rectum for both techniques are also less than 5% due to the position of OAR is very close to target volume. On the other hand, the dose difference at Femoral head are more than 5% for both techniques because the location of OAR already in low gradient dose. Furthermore, the difference dose of the target volume for IMRT technique is tends to be smaller than VMAT either for TLD and film detectors. The dose difference at point dose of target volume between IMRT and VMAT techniqe are less than 1% but it occur in random number for organ at risk. More over, the surface dose of IMRT tend to be smaller than VMAT dose if we are using TLDs, but the dose of EBT2 films tend to be similar between IMRT and VMAT techniques, Have been done the dose verification of the target and healthy tissues around by placing the TLD Rod LiF100 and EBT2 Gafchromic film at slab hole of pelvic part of the Alderson Rando phantom for

prostate cancer simulation. The Exposed TLDs was evaluated using the TLD Reader Harshaw, while Gafchromic Film EBT2 was scanned using Epson Perfection V700 scanner with transmission mode, red channel and resolution 72 dpi. The point dose measurements were compared between planned dose TPS Eclipse ver. 11 and measured dose at target volume organ and organ at risk for IMRT and VMAT techniques. The result is the dose difference at target volume for IMRT and VMAT are less than 5%. Similarly, the dose difference at Bladder and Rectum for both techniques are also less than 5% due to the position of OAR is very close to target volume. On the other hand, the dose difference at Femoral head are more than 5% for both techniques because the location of OAR already in low gradient dose. Furthermore, the difference dose of the target volume for IMRT technique is tends to be smaller than VMAT either for TLD and film detectors. The dose difference at point dose of target volume between IMRT and VMAT techniqe are less than 1% but it occur in random number for organ at risk. More over, the surface dose of IMRT tend to be smaller than VMAT dose if we are using TLDs, but the dose of EBT2 films tend to be similar between IMRT and VMAT techniques]