



ภาคผนวก

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

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ภาคผนวก ก

การเปรียบเทียบปริมาณรังสีสมบูรณ์ที่อวัยวะเป้าหมายและอวัยวะสำคัญข้างเคียง จากการศึกษาจำนวนทิศทางของลำรังสี (5, 7 และ 9 ทิศทางลำรังสี) ที่มีต่อการวางแผนรังสีรักษา ของเทคนิคฉายรังสีแปรความเข้มในผู้ป่วยโรคมะเร็งปากมดลูกระยะที่สองและสาม

| Case no. | D ₉₅ | | | CI | | |
|----------|-----------------|---------|---------|--------|--------|--------|
| | IMRT 5 | IMRT 7 | IMRT 9 | IMRT 5 | IMRT 7 | IMRT 9 |
| 1.0 | 4441.0 | 4475.0 | 4493.0 | 3.2 | 3.0 | 3.0 |
| 2.0 | 4491.0 | 4472.0 | 4483.0 | 3.5 | 3.2 | 3.2 |
| 3.0 | 4500.0 | 4524.0 | 4519.0 | 3.2 | 2.9 | 2.9 |
| 4.0 | 4497.0 | 4530.0 | 4539.0 | 2.8 | 2.7 | 2.7 |
| 5.0 | 4521.0 | 4542.0 | 4549.0 | 2.8 | 2.6 | 2.5 |
| 6.0 | 4540.0 | 4531.0 | 4532.0 | 3.5 | 3.2 | 3.2 |
| 7.0 | 4476.0 | 4544.0 | 4511.0 | 4.8 | 4.7 | 4.7 |
| 8.0 | 4516.0 | 4576.0 | 4536.0 | 6.2 | 5.8 | 5.8 |
| 9.0 | 4606.0 | 4513.0 | 4522.0 | 5.4 | 4.8 | 4.8 |
| 10.0 | 4469.0 | 4506.0 | 4531.0 | 5.0 | 4.9 | 4.7 |
| 11.0 | 4471.0 | 4528.0 | 4526.0 | 4.8 | 4.6 | 4.4 |
| 12.0 | 4514.0 | 4504.0 | 4509.0 | 4.8 | 4.5 | 4.3 |
| 13.0 | 4506.0 | 4559.0 | 4533.0 | 6.0 | 5.4 | 5.4 |
| 14.0 | 4569.0 | 4572.0 | 4595.0 | 5.8 | 5.3 | 5.1 |
| 15.0 | 4554.0 | 4581.0 | 4533.0 | 5.3 | 4.8 | 4.6 |
| 16.0 | 4519.0 | 4535.0 | 4512.0 | 3.2 | 2.9 | 2.9 |
| 17.0 | 4522.0 | 4527.0 | 4526.0 | 3.8 | 3.4 | 3.6 |
| 18.0 | 4523.0 | 4549.0 | 4555.0 | 4.5 | 3.9 | 3.9 |
| 19.0 | 4494.0 | 4645.0 | 4557.0 | 2.5 | 2.4 | 2.4 |
| 20.0 | 4467.0 | 4482.0 | 4520.0 | 1.8 | 1.6 | 1.7 |
| 21.0 | 4594.0 | 4600.0 | 4579.0 | 2.6 | 2.3 | 2.3 |
| Average | 4513.81 | 4537.86 | 4531.43 | 4.07 | 3.76 | 3.72 |
| SD | 41.67 | 41.93 | 25.94 | 1.28 | 1.19 | 1.14 |

| Case no. | Bladder | | | Rectum | | |
|-----------|---------|---------|---------|---------|---------|---------|
| | IMRT 5 | IMRT 7 | IMRT 9 | IMRT 5 | IMRT 7 | IMRT 9 |
| 1.0 | 4157.0 | 4170.0 | 4105.0 | 3839.0 | 4170.0 | 3751.0 |
| 2.0 | 4088.0 | 4110.0 | 4100.0 | 3828.0 | 3951.0 | 3844.0 |
| 3.0 | 4181.0 | 4240.0 | 4199.0 | 3978.0 | 4016.0 | 3880.0 |
| 4.0 | 3679.0 | 3627.0 | 3636.0 | 3783.0 | 3654.0 | 3625.0 |
| 5.0 | 3776.0 | 3712.0 | 3644.0 | 3751.0 | 3633.0 | 3681.0 |
| 6.0 | 3482.0 | 3486.0 | 3489.0 | 3383.0 | 3363.0 | 3284.0 |
| 7.0 | 4018.0 | 4135.0 | 4030.0 | 2754.0 | 2790.0 | 2737.0 |
| 8.0 | 3900.0 | 3922.0 | 3935.0 | 2716.0 | 2758.0 | 2727.0 |
| 9.0 | 4037.0 | 4108.0 | 4040.0 | 2727.0 | 2770.0 | 2740.0 |
| 10.0 | 3893.0 | 3976.0 | 4021.0 | 3535.0 | 3541.0 | 3646.0 |
| 11.0 | 3951.0 | 4066.0 | 4142.0 | 3422.0 | 3607.0 | 3601.0 |
| 12.0 | 4073.0 | 4117.0 | 4127.0 | 3709.0 | 3744.0 | 3727.0 |
| 13.0 | 3884.0 | 3326.0 | 3339.0 | 2975.0 | 2919.0 | 2877.0 |
| 14.0 | 3463.0 | 3466.0 | 3494.0 | 3116.0 | 3193.0 | 3601.0 |
| 15.0 | 3741.0 | 3775.0 | 3772.0 | 3316.0 | 3291.0 | 3235.0 |
| 16.0 | 3943.0 | 4008.0 | 4004.0 | 3448.0 | 3454.0 | 3347.0 |
| 17.0 | 3645.0 | 3757.0 | 3817.0 | 3415.0 | 3434.0 | 3468.0 |
| 18.0 | 3388.0 | 3433.0 | 3485.0 | 2826.0 | 2935.0 | 3851.0 |
| 19.0 | 1388.0 | 1434.0 | 1424.0 | 3142.0 | 3177.0 | 3069.0 |
| 20.0 | 3122.0 | 3123.0 | 3134.0 | 3500.0 | 3545.0 | 3549.0 |
| 21.0 | 1505.0 | 1430.0 | 1450.0 | 3201.0 | 3139.0 | 3127.0 |
| Average | 3586.38 | 3591.48 | 3589.86 | 3350.67 | 3384.95 | 3398.43 |
| SD | 762.10 | 783.06 | 775.36 | 393.56 | 412.24 | 386.52 |
| ค่าต่ำสุด | 1388.00 | 1430.00 | 1424.00 | 2716.00 | 2758.00 | 2727.00 |
| ค่าสูงสุด | 4181.00 | 4240.00 | 4199.00 | 3978.00 | 4170.00 | 3880.00 |

| Case no. | Small bowel | | | Femoral heads | | |
|-----------|-------------|---------|---------|---------------|---------|---------|
| | IMRT 5 | IMRT 7 | IMRT 9 | IMRT 5 | IMRT 7 | IMRT 9 |
| 1.0 | 2679.0 | 2517.0 | 2411.0 | 2475.0 | 1788.0 | 2051.0 |
| 2.0 | 2566.0 | 2562.0 | 2416.0 | 2515.0 | 1590.0 | 1931.0 |
| 3.0 | 2599.0 | 2511.0 | 2445.0 | 2524.0 | 1738.0 | 1954.0 |
| 4.0 | 2178.0 | 2026.0 | 2027.0 | 2652.0 | 1927.0 | 2146.0 |
| 5.0 | 2106.0 | 2040.0 | 2033.0 | 2663.0 | 2002.0 | 2170.0 |
| 6.0 | 2097.0 | 2036.0 | 2019.0 | 2516.0 | 1898.0 | 2038.0 |
| 7.0 | 2426.0 | 2398.0 | 2337.0 | 1713.5 | 1494.0 | 1503.0 |
| 8.0 | 2370.0 | 2392.0 | 2338.0 | 1668.0 | 1387.0 | 1546.0 |
| 9.0 | 2360.0 | 2365.0 | 2335.0 | 1726.0 | 1554.0 | 1614.0 |
| 10.0 | 2215.0 | 2231.0 | 2162.0 | 1530.0 | 1892.0 | 1515.0 |
| 11.0 | 2204.0 | 2205.0 | 2187.0 | 1588.0 | 2002.0 | 1537.0 |
| 12.0 | 2206.0 | 2213.0 | 2118.0 | 1711.0 | 2023.0 | 1633.0 |
| 13.0 | 2370.0 | 2233.0 | 2282.0 | 1467.0 | 1311.0 | 1446.0 |
| 14.0 | 2304.0 | 2245.0 | 2273.0 | 1658.0 | 1432.0 | 1571.0 |
| 15.0 | 2311.0 | 2248.0 | 2287.0 | 1816.0 | 1540.0 | 1702.0 |
| 16.0 | 2105.0 | 1866.0 | 1935.0 | 1332.0 | 1788.0 | 1954.0 |
| 17.0 | 2041.0 | 1885.0 | 1920.0 | 2208.0 | 1586.0 | 1671.0 |
| 18.0 | 2030.0 | 1868.0 | 1909.0 | 2040.0 | 1349.0 | 1614.0 |
| 19.0 | 2157.0 | 2028.0 | 2051.0 | 834.0 | 724.0 | 838.0 |
| 20.0 | 2139.0 | 2112.0 | 2188.0 | 1232.0 | 970.0 | 1177.0 |
| 21.0 | 2012.0 | 2028.0 | 2044.0 | 828.0 | 724.0 | 807.0 |
| Average | 2260.71 | 2190.90 | 2177.00 | 1842.69 | 1558.05 | 1638.95 |
| SD | 190.67 | 212.96 | 172.43 | 564.23 | 387.62 | 374.17 |
| ค่าต่ำสุด | 2012.00 | 1866.00 | 1909.00 | 828.00 | 724.00 | 807.00 |
| ค่าสูงสุด | 2679.00 | 2562.00 | 2445.00 | 2663.00 | 2023.00 | 2170.00 |

| Case no. | Bone marrow | | | V_{20} | | |
|-----------|-------------|---------|---------|----------|--------|--------|
| | IMRT 5 | IMRT 7 | IMRT 9 | IMRT 5 | IMRT 7 | IMRT 9 |
| 1.0 | 1924.0 | 1859.0 | 1864.0 | 76.4 | 51.3 | 49.9 |
| 2.0 | 1821.0 | 1817.0 | 1833.0 | 72.4 | 51.5 | 49.5 |
| 3.0 | 1865.0 | 1867.0 | 1844.0 | 73.3 | 50.5 | 53.5 |
| 4.0 | 2050.0 | 2043.0 | 1935.0 | 71.4 | 50.9 | 50.5 |
| 5.0 | 2039.0 | 2072.0 | 1951.0 | 74.1 | 49.4 | 52.5 |
| 6.0 | 1958.0 | 2017.0 | 1888.0 | 75.4 | 49.4 | 50.1 |
| 7.0 | 1914.0 | 1983.0 | 1885.0 | 72.7 | 49.5 | 50.9 |
| 8.0 | 1986.0 | 1927.0 | 1891.0 | 76.4 | 53.5 | 48.5 |
| 9.0 | 1868.0 | 1953.0 | 1902.0 | 74.0 | 50.5 | 50.5 |
| 10.0 | 1801.0 | 1791.0 | 1632.0 | 74.4 | 52.5 | 51.0 |
| 11.0 | 1747.0 | 1811.0 | 1659.0 | 75.1 | 50.1 | 52.8 |
| 12.0 | 1795.0 | 1924.0 | 1699.0 | 74.7 | 50.5 | 51.3 |
| 13.0 | 1924.0 | 1885.0 | 1838.0 | 77.4 | 48.5 | 51.7 |
| 14.0 | 2001.0 | 1941.0 | 1950.0 | 73.4 | 50.5 | 51.5 |
| 15.0 | 2032.0 | 1955.0 | 1926.0 | 74.0 | 49.5 | 50.9 |
| 16.0 | 1685.0 | 1663.0 | 1585.0 | 74.4 | 50.5 | 49.4 |
| 17.0 | 1597.0 | 1578.0 | 1523.0 | 72.8 | 50.0 | 49.7 |
| 18.0 | 1517.0 | 1522.0 | 1476.0 | 76.4 | 52.5 | 49.5 |
| 19.0 | 1571.0 | 1485.0 | 1507.0 | 74.9 | 50.5 | 53.5 |
| 20.0 | 1652.0 | 1567.0 | 1601.0 | 77.4 | 49.0 | 50.8 |
| 21.0 | 1533.0 | 1485.0 | 1492.0 | 70.9 | 50.1 | 52.5 |
| Average | 1822.86 | 1816.43 | 1756.24 | 74.38 | 50.51 | 50.98 |
| SD | 172.98 | 189.81 | 171.46 | 1.80 | 1.23 | 1.39 |
| ค่าต่ำสุด | 1517.00 | 1485.00 | 1476.00 | 70.90 | 48.50 | 48.50 |
| ค่าสูงสุด | 2050.00 | 2072.00 | 1951.00 | 77.40 | 53.50 | 53.50 |

| Case no. | V ₃₀ | | | V ₁₀₀ | | |
|-----------|-----------------|--------|--------|------------------|--------|--------|
| | IMRT 5 | IMRT 7 | IMRT 9 | IMRT 5 | IMRT 7 | IMRT 9 |
| 1.0 | 39.9 | 42.3 | 43.0 | 0.6 | 0.0 | 0.0 |
| 2.0 | 40.1 | 42.6 | 43.1 | 0.9 | 0.6 | 0.3 |
| 3.0 | 39.9 | 41.7 | 39.7 | 1.2 | 0.6 | 0.6 |
| 4.0 | 38.9 | 39.4 | 42.0 | 1.2 | 0.3 | 0.3 |
| 5.0 | 41.9 | 43.6 | 41.7 | 1.5 | 0.6 | 0.3 |
| 6.0 | 37.4 | 42.6 | 42.8 | 1.2 | 0.3 | 0.0 |
| 7.0 | 41.7 | 38.9 | 41.7 | 0.6 | 0.0 | 0.0 |
| 8.0 | 39.9 | 41.9 | 39.9 | 0.9 | 0.0 | 0.0 |
| 9.0 | 38.7 | 42.8 | 41.7 | 0.9 | 0.0 | 0.0 |
| 10.0 | 38.2 | 41.7 | 39.0 | 0.9 | 0.3 | 0.3 |
| 11.0 | 38.9 | 43.5 | 43.0 | 0.9 | 0.3 | 0.3 |
| 12.0 | 41.9 | 42.0 | 42.2 | 0.9 | 0.3 | 0.3 |
| 13.0 | 37.8 | 41.7 | 39.4 | 3.0 | 3.0 | 2.1 |
| 14.0 | 41.7 | 42.8 | 43.6 | 3.0 | 3.0 | 2.1 |
| 15.0 | 39.9 | 41.7 | 42.6 | 2.7 | 2.7 | 1.7 |
| 16.0 | 42.5 | 39.9 | 38.9 | 1.2 | 0.6 | 0.3 |
| 17.0 | 41.7 | 41.7 | 41.9 | 1.2 | 0.6 | 0.3 |
| 18.0 | 39.9 | 39.0 | 42.8 | 1.2 | 0.6 | 0.3 |
| 19.0 | 39.2 | 43.0 | 41.7 | 0.6 | 0.0 | 0.0 |
| 20.0 | 39.4 | 43.1 | 43.5 | 0.6 | 0.0 | 0.0 |
| 21.0 | 38.9 | 39.7 | 41.7 | 0.6 | 0.0 | 0.0 |
| Average | 39.92 | 41.70 | 41.71 | 1.23 | 0.66 | 0.44 |
| SD | 1.47 | 1.46 | 1.47 | 0.75 | 0.97 | 0.67 |
| ค่าต่ำสุด | 37.40 | 38.90 | 38.90 | 0.60 | 0.00 | 0.00 |
| ค่าสูงสุด | 42.50 | 43.60 | 43.60 | 3.00 | 3.00 | 2.10 |

| Case no. | MU | | | Segments | | |
|-----------|---------|---------|---------|----------|--------|--------|
| | IMRT 5 | IMRT 7 | IMRT 9 | IMRT 5 | IMRT 7 | IMRT 9 |
| 1.0 | 787 | 937 | 997 | 60 | 89 | 119 |
| 2.0 | 757 | 836 | 942 | 60 | 90 | 120 |
| 3.0 | 675 | 782 | 825 | 66 | 91 | 119 |
| 4.0 | 987 | 1095 | 1049 | 70 | 96 | 115 |
| 5.0 | 968 | 986 | 956 | 77 | 92 | 140 |
| 6.0 | 839 | 942 | 885 | 63 | 109 | 116 |
| 7.0 | 563 | 624 | 651 | 51 | 76 | 102 |
| 8.0 | 879 | 916 | 956 | 71 | 90 | 119 |
| 9.0 | 856 | 857 | 942 | 74 | 92 | 118 |
| 10.0 | 801 | 806 | 799 | 61 | 93 | 120 |
| 11.0 | 1078 | 1029 | 1022 | 83 | 89 | 117 |
| 12.0 | 911 | 947 | 952 | 78 | 104 | 137 |
| 13.0 | 879 | 949 | 900 | 76 | 91 | 116 |
| 14.0 | 567 | 589 | 644 | 62 | 71 | 100 |
| 15.0 | 798 | 881 | 958 | 69 | 92 | 120 |
| 16.0 | 834 | 884 | 957 | 75 | 91 | 120 |
| 17.0 | 687 | 781 | 823 | 62 | 87 | 122 |
| 18.0 | 987 | 1087 | 1079 | 82 | 95 | 110 |
| 19.0 | 865 | 937 | 973 | 79 | 100 | 138 |
| 20.0 | 811 | 886 | 898 | 76 | 92 | 122 |
| 21.0 | 622 | 644 | 645 | 66 | 72 | 102 |
| Average | 816.71 | 875.95 | 897.76 | 69.57 | 90.57 | 118.67 |
| SD | 137.31 | 137.18 | 125.98 | 8.57 | 9.03 | 10.50 |
| ค่าต่ำสุด | 563.00 | 589.00 | 644.00 | 51.00 | 71.00 | 100.00 |
| ค่าสูงสุด | 1078.00 | 1095.00 | 1079.00 | 83.00 | 109.00 | 140.00 |

ภาคผนวก ข

การเปรียบเทียบปริมาณรังสีสมบูรณ์ที่อวัยวะเป้าหมายและอวัยวะสำคัญข้างเคียง จากการวิเคราะห์เปรียบเทียบปริมาณรังสีสมบูรณ์ที่อวัยวะเป้าหมายและอวัยวะสำคัญข้างเคียงระหว่างรักษาเทคนิคฉายรังสีแบบดั้งเดิมและเทคนิคฉายรังสีแปรความเข้ม

PTV

| Case no. | D _{max} | | | D _{min} | | | D _{mean} | | |
|-----------|------------------|---------|---------|------------------|---------|---------|-------------------|---------|---------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 4744.7 | 4809.0 | 5608.0 | 4394.6 | 4369.2 | 3752.0 | 4560.1 | 4547.2 | 4973.0 |
| 2 | 4721.0 | 4781.0 | 5527.0 | 4444.0 | 4346.0 | 3764.0 | 4556.0 | 4536.0 | 4935.0 |
| 3 | 4750.0 | 4808.0 | 5517.0 | 4444.0 | 4343.0 | 3789.0 | 4564.0 | 4548.0 | 4961.0 |
| 4 | 4931.0 | 4747.0 | 5402.0 | 4503.9 | 4270.0 | 3399.0 | 4695.5 | 4548.0 | 4927.0 |
| 5 | 4910.5 | 4751.0 | 5421.0 | 4504.0 | 4270.0 | 3127.0 | 4695.0 | 4550.0 | 4927.0 |
| 6 | 4885.0 | 4733.0 | 5463.0 | 4507.0 | 4277.0 | 3437.0 | 4690.0 | 4543.0 | 4950.0 |
| 7 | 4821.7 | 4804.0 | 5349.0 | 4494.0 | 4447.0 | 3654.0 | 4662.7 | 4593.0 | 4933.0 |
| 8 | 4805.0 | 4793.2 | 5409.0 | 4501.0 | 4459.4 | 3777.0 | 4666.0 | 4576.3 | 4962.0 |
| 9 | 4821.0 | 4811.0 | 5369.0 | 4498.0 | 4447.0 | 3692.0 | 4667.0 | 4599.0 | 4926.0 |
| 10 | 4648.6 | 4632.1 | 5411.0 | 4500.3 | 4355.2 | 3941.0 | 4590.3 | 4508.8 | 4909.0 |
| 11 | 4686.0 | 4644.0 | 5491.0 | 4468.0 | 4352.0 | 4035.0 | 4588.0 | 4510.0 | 4917.0 |
| 12 | 4708.0 | 4697.0 | 5498.0 | 4467.0 | 4351.0 | 3896.0 | 4591.0 | 4515.0 | 4909.0 |
| 13 | 4728.4 | 4728.4 | 5351.0 | 4472.9 | 4472.9 | 3988.0 | 4613.9 | 4613.9 | 4970.0 |
| 14 | 4728.0 | 4728.0 | 5340.0 | 4473.0 | 4473.0 | 3882.0 | 4611.0 | 4611.0 | 4958.0 |
| 15 | 4735.0 | 4735.0 | 5357.0 | 4473.0 | 4473.0 | 3858.0 | 4616.0 | 4616.0 | 4943.0 |
| 16 | 4669.0 | 4753.0 | 5462.0 | 4309.0 | 4162.0 | 3625.0 | 4478.0 | 4437.0 | 4947.0 |
| 17 | 4658.0 | 4682.0 | 5516.0 | 4309.0 | 4162.0 | 3563.0 | 4467.0 | 4420.0 | 4946.0 |
| 18 | 4595.0 | 4625.0 | 5344.0 | 4331.0 | 4199.0 | 3788.0 | 4459.0 | 4410.0 | 4914.0 |
| 19 | 4867.0 | 4764.0 | 5419.0 | 4428.0 | 4406.0 | 3746.0 | 4563.0 | 4540.0 | 4978.0 |
| 20 | 4882.0 | 4797.0 | 5466.0 | 4394.0 | 3666.0 | 3533.0 | 4587.0 | 4538.0 | 4945.0 |
| 21 | 4867.0 | 4757.0 | 5582.0 | 4428.0 | 4340.0 | 3813.0 | 4570.0 | 4757.0 | 4971.0 |
| Average | 4769.61 | 4741.89 | 5442.95 | 4444.94 | 4316.22 | 3717.10 | 4594.79 | 4548.44 | 4942.90 |
| SD | 95.89 | 57.91 | 79.54 | 63.74 | 178.24 | 215.58 | 70.38 | 75.56 | 21.70 |
| ค่าต่ำสุด | 4595.00 | 4625.00 | 5340.00 | 4309.00 | 3666.00 | 3127.00 | 4459.00 | 4410.00 | 4909.00 |
| ค่าสูงสุด | 4931.00 | 4811.00 | 5608.00 | 4507.00 | 4473.00 | 4035.00 | 4695.50 | 4757.00 | 4978.00 |

| Case no. | D ₁₀₀ | | | D ₉₅ | | | D ₉₀ | | |
|-----------|------------------|---------|---------|-----------------|---------|---------|-----------------|---------|---------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 4395.0 | 4365.0 | 3990.0 | 4476.0 | 4476.0 | 4475.0 | 4492.0 | 4475.0 | 4650.0 |
| 2 | 4440.0 | 4335.0 | 3960.0 | 4489.0 | 4489.0 | 4472.0 | 4497.0 | 4427.0 | 4620.0 |
| 3 | 4440.0 | 4335.0 | 4040.0 | 4481.0 | 4481.0 | 4524.0 | 4481.0 | 4431.0 | 4680.0 |
| 4 | 4500.0 | 4260.0 | 3820.0 | 4574.0 | 4547.0 | 4530.0 | 4597.0 | 4437.0 | 4690.0 |
| 5 | 4500.0 | 4260.0 | 3800.0 | 4576.0 | 4576.0 | 4542.0 | 4594.0 | 4438.0 | 4710.0 |
| 6 | 4500.0 | 4275.0 | 3840.0 | 4571.0 | 4571.0 | 4531.0 | 4591.0 | 4429.0 | 4690.0 |
| 7 | 4485.0 | 4440.0 | 3950.0 | 4581.0 | 4581.0 | 4544.0 | 4597.0 | 4492.0 | 4690.0 |
| 8 | 4500.0 | 4485.0 | 4030.0 | 4566.0 | 4566.0 | 4576.0 | 4601.0 | 4493.0 | 4740.0 |
| 9 | 4485.0 | 4440.0 | 3960.0 | 4592.0 | 4592.0 | 4513.0 | 4602.0 | 4497.0 | 4660.0 |
| 10 | 4500.0 | 4350.0 | 4190.0 | 4537.0 | 4537.0 | 4506.0 | 4548.0 | 4427.0 | 4630.0 |
| 11 | 4470.0 | 4350.0 | 4190.0 | 4523.0 | 4523.0 | 4528.0 | 4537.0 | 4425.0 | 4660.0 |
| 12 | 4455.0 | 4350.0 | 4120.0 | 4517.0 | 4517.0 | 4504.0 | 4538.0 | 4427.0 | 4630.0 |
| 13 | 4476.0 | 4399.0 | 4110.0 | 4508.0 | 4508.0 | 4559.0 | 4530.0 | 4474.0 | 4690.0 |
| 14 | 4470.0 | 4350.0 | 4120.0 | 4496.0 | 4496.0 | 4572.0 | 4517.0 | 4466.0 | 4710.0 |
| 15 | 4470.0 | 4350.0 | 4190.0 | 4498.0 | 4498.0 | 4581.0 | 4527.0 | 4470.0 | 4730.0 |
| 16 | 4305.0 | 4155.0 | 3990.0 | 4371.0 | 4371.0 | 4535.0 | 4395.0 | 4282.0 | 4680.0 |
| 17 | 4305.0 | 4155.0 | 4120.0 | 4367.0 | 4367.0 | 4527.0 | 4387.0 | 4266.0 | 4680.0 |
| 18 | 4320.0 | 4335.0 | 4100.0 | 4378.0 | 4378.0 | 4549.0 | 4396.0 | 4275.0 | 4680.0 |
| 19 | 4425.0 | 4395.0 | 4030.0 | 4468.0 | 4468.0 | 4645.0 | 4479.0 | 4474.0 | 4810.0 |
| 20 | 4395.0 | 4350.0 | 3830.0 | 4476.0 | 4476.0 | 4482.0 | 4488.0 | 4453.0 | 4680.0 |
| 21 | 4425.0 | 4335.0 | 4010.0 | 4470.0 | 4470.0 | 4600.0 | 4489.0 | 4476.0 | 4790.0 |
| Average | 4441.00 | 4336.62 | 4018.57 | 4500.71 | 4499.43 | 4537.86 | 4518.24 | 4430.19 | 4690.48 |
| SD | 63.87 | 81.88 | 123.02 | 67.34 | 66.12 | 41.93 | 67.95 | 69.55 | 47.59 |
| ค่าต่ำสุด | 4305.00 | 4155.00 | 3800.00 | 4367.00 | 4367.00 | 4472.00 | 4387.00 | 4266.00 | 4620.00 |
| ค่าสูงสุด | 4500.00 | 4485.00 | 4190.00 | 4592.00 | 4592.00 | 4645.00 | 4602.00 | 4497.00 | 4810.00 |

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| Case no. | D ₅₀ | | | V ₁₀₀ | | | V ₉₅ | | |
|-----------|-----------------|---------|---------|------------------|-------|--------|-----------------|--------|--------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 4552.0 | 4532.0 | 5047.0 | 82.7 | 58.8 | 94.3 | 100.0 | 100.0 | 98.5 |
| 2 | 4545.0 | 4520.0 | 5004.0 | 82.4 | 62.4 | 94.6 | 100.0 | 100.0 | 98.5 |
| 3 | 4552.0 | 4532.0 | 5020.0 | 90.9 | 62.2 | 96.1 | 100.0 | 100.0 | 98.8 |
| 4 | 4678.0 | 4556.0 | 4986.0 | 100.0 | 75.2 | 96.7 | 100.0 | 100.0 | 98.2 |
| 5 | 4688.0 | 4558.0 | 4976.0 | 100.0 | 78.2 | 96.4 | 100.0 | 100.0 | 98.5 |
| 6 | 4687.0 | 4551.0 | 5009.0 | 100.0 | 75.8 | 96.0 | 100.0 | 100.0 | 98.2 |
| 7 | 4657.0 | 4581.0 | 4986.0 | 100.0 | 86.2 | 96.1 | 100.0 | 100.0 | 99.1 |
| 8 | 4663.0 | 4587.0 | 4996.0 | 100.0 | 88.2 | 97.0 | 100.0 | 100.0 | 99.4 |
| 9 | 4663.0 | 4585.0 | 4982.0 | 100.0 | 86.6 | 95.6 | 100.0 | 100.0 | 99.1 |
| 10 | 4593.0 | 4571.0 | 4942.0 | 100.0 | 68.0 | 96.4 | 100.0 | 100.0 | 99.4 |
| 11 | 4588.0 | 4519.0 | 4953.0 | 99.2 | 68.1 | 96.1 | 100.0 | 100.0 | 99.4 |
| 12 | 4594.0 | 4522.0 | 4959.0 | 98.6 | 67.2 | 95.8 | 100.0 | 100.0 | 99.4 |
| 13 | 4620.0 | 4519.0 | 5026.0 | 96.0 | 73.2 | 97.0 | 100.0 | 100.0 | 99.4 |
| 14 | 4615.0 | 4521.0 | 5020.0 | 94.1 | 71.4 | 97.0 | 100.0 | 100.0 | 99.7 |
| 15 | 4623.0 | 4523.0 | 4988.0 | 94.9 | 71.9 | 97.6 | 100.0 | 100.0 | 99.4 |
| 16 | 4478.0 | 4436.0 | 4987.0 | 88.0 | 80.0 | 96.1 | 100.0 | 100.0 | 98.8 |
| 17 | 4463.0 | 4423.0 | 5030.0 | 88.3 | 84.0 | 96.1 | 100.0 | 100.0 | 98.5 |
| 18 | 4460.0 | 4412.0 | 4957.0 | 91.2 | 86.0 | 96.7 | 100.0 | 100.0 | 99.1 |
| 19 | 4545.0 | 4537.0 | 5028.0 | 80.7 | 75.0 | 97.6 | 100.0 | 100.0 | 99.4 |
| 20 | 4567.0 | 4535.0 | 5007.0 | 86.1 | 71.0 | 95.3 | 100.0 | 100.0 | 98.1 |
| 21 | 4553.0 | 4536.0 | 5024.0 | 82.6 | 77.1 | 97.0 | 100.0 | 100.0 | 98.8 |
| Average | 4589.71 | 4526.48 | 4996.52 | 93.13 | 74.60 | 96.26 | 100.00 | 100.00 | 98.94 |
| SD | 70.34 | 48.51 | 28.78 | 7.09 | 8.54 | 0.85 | 0.00 | 0.00 | 0.49 |
| ค่าต่ำสุด | 4460.00 | 4412.00 | 4942.00 | 80.70 | 58.80 | 94.30 | 100.00 | 100.00 | 98.10 |
| ค่าสูงสุด | 4688.00 | 4587.00 | 5047.00 | 100.00 | 88.20 | 97.60 | 100.00 | 100.00 | 99.70 |

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| Case no. | V ₉₀ | | | V _{93 = Cold spot} | | | V _{110 = Hot spot} | | |
|-----------|-----------------|--------|--------|-----------------------------|------|--------|-----------------------------|------|--------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1.0 | 100.0 | 100.0 | 99.4 | 0.0 | 0.0 | 0.9 | 0.0 | 0.0 | 18.6 |
| 2.0 | 100.0 | 100.0 | 99.7 | 0.0 | 0.0 | 0.9 | 0.0 | 0.0 | 13.0 |
| 3.0 | 100.0 | 100.0 | 99.7 | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 | 16.0 |
| 4.0 | 100.0 | 100.0 | 99.4 | 0.0 | 0.0 | 0.9 | 0.0 | 0.0 | 4.5 |
| 5.0 | 100.0 | 100.0 | 99.7 | 0.0 | 0.0 | 0.9 | 0.0 | 0.0 | 7.9 |
| 6.0 | 100.0 | 100.0 | 99.7 | 0.0 | 0.0 | 0.9 | 0.0 | 0.0 | 8.2 |
| 7.0 | 100.0 | 100.0 | 99.7 | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 | 6.3 |
| 8.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14.8 |
| 9.0 | 100.0 | 100.0 | 99.7 | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 | 4.5 |
| 10.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 11.2 |
| 11.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 9.7 |
| 12.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 8.7 |
| 13.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 17.8 |
| 14.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 11.5 |
| 15.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 8.2 |
| 16.0 | 100.0 | 100.0 | 99.7 | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 | 11.8 |
| 17.0 | 100.0 | 100.0 | 99.4 | 0.0 | 0.0 | 0.9 | 0.0 | 0.0 | 14.5 |
| 18.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 6.9 |
| 19.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 13.3 |
| 20.0 | 100.0 | 100.0 | 99.4 | 0.0 | 0.0 | 0.9 | 0.0 | 0.0 | 13.8 |
| 21.0 | 100.0 | 100.0 | 99.7 | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 | 9.4 |
| Average | 100.00 | 100.00 | 99.77 | 0.00 | 0.00 | 0.50 | 0.00 | 0.00 | 10.98 |
| SD | 0.00 | 0.00 | 0.23 | 0.00 | 0.00 | 0.35 | 0.00 | 0.00 | 4.07 |
| ค่าต่ำสุด | 100.00 | 100.00 | 99.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.50 |
| ค่าสูงสุด | 100.00 | 100.00 | 100.00 | 0.00 | 0.00 | 0.90 | 0.00 | 0.00 | 18.60 |

| Case no. | Conformity index | | |
|-----------|------------------|-------|--------|
| | Opposing | Box | IMRT 7 |
| 1.0 | 16.97 | 9.97 | 3.03 |
| 2.0 | 18.12 | 10.65 | 3.24 |
| 3.0 | 15.36 | 9.03 | 2.90 |
| 4.0 | 10.61 | 7.06 | 2.72 |
| 5.0 | 9.94 | 6.61 | 2.61 |
| 6.0 | 13.06 | 8.69 | 3.21 |
| 7.0 | 17.37 | 11.28 | 4.71 |
| 8.0 | 21.48 | 13.95 | 5.75 |
| 9.0 | 17.87 | 11.60 | 4.85 |
| 10.0 | 28.46 | 14.48 | 5.00 |
| 11.0 | 26.09 | 13.28 | 4.58 |
| 12.0 | 24.36 | 12.39 | 4.51 |
| 13.0 | 27.71 | 16.36 | 5.38 |
| 14.0 | 25.89 | 15.28 | 5.30 |
| 15.0 | 22.39 | 13.22 | 4.81 |
| 16.0 | 14.83 | 6.92 | 2.94 |
| 17.0 | 19.01 | 8.87 | 3.41 |
| 18.0 | 24.09 | 11.24 | 3.86 |
| 19.0 | 17.35 | 12.30 | 2.37 |
| 20.0 | 10.54 | 7.47 | 1.59 |
| 21.0 | 16.92 | 12.00 | 2.31 |
| Average | 18.97 | 11.08 | 3.77 |
| SD | 5.66 | 2.84 | 1.20 |
| ค่าต่ำสุด | 9.94 | 6.61 | 1.59 |
| ค่าสูงสุด | 28.46 | 16.36 | 5.75 |

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CTV

| Case no. | D _{max} | | | D _{min} | | | D _{mean} | | |
|-----------|------------------|---------|---------|------------------|---------|---------|-------------------|---------|---------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 4706.0 | 4767.3 | 5420.0 | 4446.0 | 4369.1 | 4729.0 | 4551.0 | 4531.5 | 5100.0 |
| 2 | 4690.0 | 4740.0 | 5367.0 | 4444.0 | 4393.0 | 4698.0 | 4541.0 | 4531.0 | 5089.0 |
| 3 | 4709.0 | 4778.0 | 5517.0 | 4445.0 | 4393.0 | 4670.0 | 4550.0 | 4526.0 | 5089.0 |
| 4 | 4862.0 | 4708.0 | 5402.0 | 4536.7 | 4337.0 | 4666.0 | 4699.4 | 4547.0 | 5020.0 |
| 5 | 4871.0 | 4712.0 | 5415.0 | 4524.0 | 4340.0 | 4650.0 | 4699.0 | 4547.0 | 4992.0 |
| 6 | 4848.0 | 4675.0 | 5361.0 | 4526.0 | 4352.0 | 4654.0 | 4693.0 | 4537.0 | 5063.0 |
| 7 | 4778.9 | 4738.9 | 5309.0 | 4582.0 | 4454.8 | 4774.0 | 4669.8 | 4597.2 | 5054.0 |
| 8 | 4781.0 | 4707.0 | 5409.0 | 4587.0 | 4455.0 | 4741.0 | 4673.0 | 4578.0 | 5067.0 |
| 9 | 4783.0 | 4722.0 | 5358.0 | 4585.0 | 4455.0 | 4710.0 | 4675.0 | 4582.0 | 5007.0 |
| 10 | 4644.3 | 4570.9 | 5351.0 | 4515.3 | 4394.0 | 4788.0 | 4593.8 | 4503.2 | 5081.0 |
| 11 | 4651.0 | 4583.0 | 5391.0 | 4515.0 | 4391.0 | 4774.0 | 4693.0 | 4504.0 | 5074.0 |
| 12 | 4673.0 | 4623.0 | 5356.0 | 4505.0 | 4373.0 | 4726.0 | 4593.0 | 4505.0 | 5042.0 |
| 13 | 4697.2 | 4579.3 | 5351.0 | 4517.9 | 4482.1 | 4811.0 | 4602.7 | 4514.5 | 5148.0 |
| 14 | 4701.0 | 4567.0 | 5328.0 | 4480.0 | 4436.0 | 4832.0 | 4600.0 | 4514.0 | 5119.0 |
| 15 | 4735.0 | 4594.0 | 5357.0 | 4473.0 | 4436.0 | 4792.0 | 4606.0 | 4516.0 | 5061.0 |
| 16 | 4608.0 | 4676.0 | 5438.0 | 4362.0 | 4232.0 | 4528.0 | 4455.0 | 4409.0 | 5050.0 |
| 17 | 4551.0 | 4592.0 | 5392.0 | 4636.0 | 4232.0 | 4776.0 | 4447.0 | 4394.0 | 5084.0 |
| 18 | 4546.0 | 4545.0 | 5266.0 | 4385.0 | 4263.0 | 4824.0 | 4443.0 | 4392.0 | 5088.0 |
| 19 | 4819.0 | 4689.0 | 5386.0 | 4438.0 | 4449.0 | 4699.0 | 4526.0 | 4527.0 | 5092.0 |
| 20 | 4862.0 | 4762.0 | 5384.0 | 4438.0 | 4406.0 | 4686.0 | 4559.0 | 4539.0 | 5043.0 |
| 21 | 4836.0 | 4695.0 | 5323.0 | 4438.0 | 4446.0 | 4755.0 | 4534.0 | 4533.0 | 5058.0 |
| Average | 4731.07 | 4667.83 | 5375.29 | 4494.23 | 4385.19 | 4727.76 | 4590.65 | 4515.59 | 5067.67 |
| SD | 99.44 | 75.30 | 51.93 | 69.54 | 72.57 | 72.34 | 83.69 | 55.14 | 36.15 |
| ค่าต่ำสุด | 4546.00 | 4545.00 | 5266.00 | 4362.00 | 4232.00 | 4528.00 | 4443.00 | 4392.00 | 4992.00 |
| ค่าสูงสุด | 4871.00 | 4778.00 | 5517.00 | 4636.00 | 4482.10 | 4832.00 | 4699.40 | 4597.20 | 5148.00 |

| Case no. | D ₁₀₀ | | | D ₉₅ | | | D ₉₀ | | |
|-----------|------------------|---------|---------|-----------------|---------|---------|-----------------|---------|---------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 4440.0 | 4395.0 | 4980.0 | 4478.0 | 4403.0 | 4946.0 | 4495.0 | 4429.0 | 5010.0 |
| 2 | 4440.0 | 4380.0 | 4770.0 | 4480.0 | 4415.0 | 4949.0 | 4488.0 | 4426.0 | 5010.0 |
| 3 | 4440.0 | 4380.0 | 4710.0 | 4481.0 | 4417.0 | 4910.0 | 4488.0 | 4429.0 | 4980.0 |
| 4 | 4530.0 | 4335.0 | 4730.0 | 4587.0 | 4429.0 | 4861.0 | 4603.0 | 4461.0 | 4930.0 |
| 5 | 4515.0 | 4335.0 | 4690.0 | 4579.0 | 4428.0 | 4795.0 | 4597.0 | 4458.0 | 4850.0 |
| 6 | 4515.0 | 4350.0 | 4740.0 | 4582.0 | 4425.0 | 4907.0 | 4595.0 | 4455.0 | 4970.0 |
| 7 | 4575.0 | 4455.0 | 4840.0 | 4612.0 | 4489.0 | 4919.0 | 4619.0 | 4497.0 | 4970.0 |
| 8 | 4575.0 | 4455.0 | 4790.0 | 4618.0 | 4477.0 | 4863.0 | 4624.0 | 4498.0 | 4890.0 |
| 9 | 4575.0 | 4455.0 | 4770.0 | 4611.0 | 4479.0 | 4859.0 | 4622.0 | 4496.0 | 4900.0 |
| 10 | 4515.0 | 4395.0 | 4880.0 | 4552.0 | 4433.0 | 4930.0 | 4563.0 | 4454.0 | 4980.0 |
| 11 | 4515.0 | 4380.0 | 4770.0 | 4548.0 | 4425.0 | 4905.0 | 4565.0 | 4478.0 | 4950.0 |
| 12 | 4500.0 | 4365.0 | 4770.0 | 4547.0 | 4428.0 | 4871.0 | 4559.0 | 4447.0 | 4920.0 |
| 13 | 4515.0 | 4470.0 | 4870.0 | 4573.0 | 4480.0 | 5015.0 | 4552.0 | 4489.0 | 5050.0 |
| 14 | 4470.0 | 4455.0 | 4890.0 | 4528.0 | 4475.0 | 5009.0 | 4543.0 | 4488.0 | 5050.0 |
| 15 | 4470.0 | 4455.0 | 4840.0 | 4515.0 | 4477.0 | 4932.0 | 4544.0 | 4482.0 | 4980.0 |
| 16 | 4350.0 | 4230.0 | 4620.0 | 4487.0 | 4382.0 | 4863.0 | 4402.0 | 4288.0 | 4930.0 |
| 17 | 4350.0 | 4230.0 | 4810.0 | 4483.0 | 4373.0 | 4930.0 | 4400.0 | 4276.0 | 4980.0 |
| 18 | 4380.0 | 4260.0 | 4850.0 | 4502.0 | 4399.0 | 4934.0 | 4408.0 | 4295.0 | 5010.0 |
| 19 | 4425.0 | 4440.0 | 4730.0 | 4463.0 | 4474.0 | 4941.0 | 4473.0 | 4492.0 | 4980.0 |
| 20 | 4425.0 | 4395.0 | 4760.0 | 4468.0 | 4472.0 | 4876.0 | 4480.0 | 4478.0 | 4930.0 |
| 21 | 4425.0 | 4440.0 | 4770.0 | 4469.0 | 4480.0 | 4912.0 | 4477.0 | 4487.0 | 4970.0 |
| Average | 4473.57 | 4383.57 | 4789.52 | 4531.57 | 4440.95 | 4910.81 | 4528.43 | 4443.00 | 4963.81 |
| SD | 68.23 | 73.62 | 79.84 | 53.39 | 36.20 | 50.94 | 72.35 | 69.47 | 50.35 |
| ค่าต่ำสุด | 4350.00 | 4230.00 | 4620.00 | 4463.00 | 4373.00 | 4795.00 | 4400.00 | 4276.00 | 4850.00 |
| ค่าสูงสุด | 4575.00 | 4470.00 | 4980.00 | 4618.00 | 4489.00 | 5015.00 | 4624.00 | 4498.00 | 5050.00 |

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| Case no. | D ₅₀ | | | V ₁₀₀ | | |
|-----------|-----------------|---------|---------|------------------|-------|--------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 4538.0 | 4517.0 | 5103.0 | 77.8 | 61.6 | 100.0 |
| 2 | 4507.0 | 4507.0 | 5106.0 | 75.0 | 54.2 | 100.0 |
| 3 | 4536.0 | 4518.0 | 5109.0 | 78.3 | 56.9 | 100.0 |
| 4 | 4699.0 | 4551.0 | 5031.0 | 100.0 | 78.6 | 100.0 |
| 5 | 4696.0 | 4555.0 | 5001.0 | 100.0 | 78.2 | 100.0 |
| 6 | 4699.0 | 4546.0 | 5089.0 | 100.0 | 75.8 | 100.0 |
| 7 | 4669.0 | 4583.0 | 5063.0 | 100.0 | 86.4 | 100.0 |
| 8 | 4668.0 | 4583.0 | 5062.0 | 100.0 | 86.6 | 100.0 |
| 9 | 4676.0 | 4584.0 | 5027.0 | 100.0 | 86.9 | 100.0 |
| 10 | 4598.0 | 4513.0 | 5100.0 | 100.0 | 66.7 | 100.0 |
| 11 | 4598.0 | 4514.0 | 5087.0 | 100.0 | 69.3 | 100.0 |
| 12 | 4597.0 | 4514.0 | 5060.0 | 100.0 | 89.5 | 100.0 |
| 13 | 4601.0 | 4513.0 | 5163.0 | 100.0 | 70.7 | 100.0 |
| 14 | 4603.0 | 4513.0 | 5132.0 | 98.7 | 68.6 | 100.0 |
| 15 | 4611.0 | 4514.0 | 5079.0 | 97.6 | 72.0 | 100.0 |
| 16 | 4454.0 | 4414.0 | 5066.0 | 87.4 | 81.0 | 100.0 |
| 17 | 4448.0 | 4401.0 | 5255.0 | 96.2 | 89.0 | 100.0 |
| 18 | 4446.0 | 4898.0 | 5115.0 | 83.6 | 87.8 | 100.0 |
| 19 | 4514.0 | 4527.0 | 5105.0 | 67.8 | 75.4 | 100.0 |
| 20 | 4538.0 | 4534.0 | 5050.0 | 78.5 | 75.5 | 100.0 |
| 21 | 4524.0 | 4531.0 | 5069.0 | 71.7 | 79.6 | 100.0 |
| Average | 4581.90 | 4539.52 | 5089.14 | 91.08 | 75.73 | 100.00 |
| SD | 83.36 | 93.80 | 53.18 | 11.55 | 10.38 | 0.00 |
| ค่าต่ำสุด | 4446.00 | 4401.00 | 5001.00 | 67.80 | 54.20 | 100.00 |
| ค่าสูงสุด | 4699.00 | 4898.00 | 5255.00 | 100.00 | 89.50 | 100.00 |

Uterus

| Case no. | D _{max} | | | D _{min} | | | D _{mean} | | |
|-----------|------------------|---------|---------|------------------|---------|---------|-------------------|---------|---------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 4781.3 | 4855.0 | 5451.0 | 4501.2 | 4485.0 | 3678.0 | 4629.6 | 4644.0 | 4990.0 |
| 2 | 4781.3 | 4855.0 | 5400.0 | 4501.2 | 4485.0 | 3701.0 | 4629.6 | 4644.0 | 4965.0 |
| 3 | 4781.3 | 4855.0 | 5414.0 | 4501.2 | 4485.0 | 3714.0 | 4629.6 | 4644.0 | 4995.0 |
| 4 | 4709.6 | 4793.2 | 5393.0 | 4462.4 | 4459.4 | 4067.0 | 4565.9 | 4576.3 | 4911.0 |
| 5 | 4709.6 | 4793.2 | 5441.0 | 4462.4 | 4459.4 | 4087.0 | 4565.9 | 4576.3 | 4974.0 |
| 6 | 4709.6 | 4793.2 | 5309.0 | 4462.4 | 4459.4 | 4054.0 | 4565.9 | 4576.3 | 4905.0 |
| Average | 4745.5 | 4824.1 | 5401.3 | 4481.8 | 4472.2 | 3883.5 | 4597.8 | 4610.2 | 4956.7 |
| SD | 39.27 | 33.85 | 50.59 | 21.25 | 14.02 | 204.17 | 34.89 | 37.08 | 39.26 |
| ค่าต่ำสุด | 4709.60 | 4793.20 | 5309.00 | 4462.40 | 4459.40 | 3678.00 | 4565.90 | 4576.30 | 4905.00 |

| Case no. | D ₁₀₀ | | | D ₉₅ | | | D ₉₀ | | |
|-----------|------------------|---------|---------|-----------------|---------|---------|-----------------|---------|---------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 4500.0 | 4485.0 | 4040.0 | 4522.0 | 4522.0 | 4544.0 | 4536.0 | 4536.0 | 4690.0 |
| 2 | 4500.0 | 4485.0 | 3980.0 | 4522.0 | 4522.0 | 4570.0 | 4536.0 | 4536.0 | 4740.0 |
| 3 | 4500.0 | 4485.0 | 4010.0 | 4522.0 | 4522.0 | 4580.0 | 4536.0 | 4536.0 | 4740.0 |
| 4 | 4455.0 | 4455.0 | 4200.0 | 4492.0 | 4494.0 | 4635.0 | 4498.0 | 4568.0 | 4690.0 |
| 5 | 4455.0 | 4455.0 | 4220.0 | 4492.0 | 4494.0 | 4599.0 | 4498.0 | 4568.0 | 4740.0 |
| 6 | 4455.0 | 4455.0 | 4206.0 | 4492.0 | 4494.0 | 4554.0 | 4498.0 | 4568.0 | 4660.0 |
| Average | 4477.50 | 4470.00 | 4109.33 | 4507.00 | 4508.00 | 4580.33 | 4517.00 | 4552.00 | 4710.00 |
| SD | 24.65 | 16.43 | 110.65 | 16.43 | 15.34 | 33.04 | 20.81 | 17.53 | 34.64 |
| ค่าต่ำสุด | 4455.00 | 4455.00 | 3980.00 | 4492.00 | 4494.00 | 4544.00 | 4498.00 | 4536.00 | 4660.00 |
| ค่าสูงสุด | 4500.00 | 4485.00 | 4220.00 | 4522.00 | 4522.00 | 4635.00 | 4536.00 | 4568.00 | 4740.00 |

| Case no. | D ₅₀ | | | V ₁₀₀ | | |
|-----------|-----------------|---------|---------|------------------|-------|--------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 4628.0 | 4644.0 | 5041.0 | 100.0 | 99.8 | 96.7 |
| 2 | 4628.0 | 4644.0 | 5018.0 | 100.0 | 99.8 | 95.8 |
| 3 | 4628.0 | 4644.0 | 5049.0 | 100.0 | 99.8 | 96.7 |
| 4 | 4560.0 | 4568.0 | 4952.0 | 89.7 | 93.6 | 96.1 |
| 5 | 4560.0 | 4568.0 | 5013.0 | 89.7 | 93.6 | 97.3 |
| 6 | 4560.0 | 4568.0 | 4941.0 | 89.7 | 93.6 | 96.7 |
| Average | 4594.00 | 4606.00 | 5002.33 | 94.85 | 96.70 | 96.55 |
| SD | 37.25 | 41.63 | 45.45 | 5.64 | 3.40 | 0.53 |
| ค่าต่ำสุด | 4560.00 | 4568.00 | 4941.00 | 89.70 | 93.60 | 95.80 |
| ค่าสูงสุด | 4628.00 | 4644.00 | 5049.00 | 100.00 | 99.80 | 97.30 |

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
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Pelvic node

| Case no. | D _{max} | | | D _{min} | | | D _{mean} | | |
|-----------|------------------|---------|---------|------------------|---------|---------|-------------------|---------|---------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 4752.0 | 4886.1 | 5388.0 | 3266.9 | 3029.3 | 3855.0 | 4590.4 | 4624.0 | 4882.0 |
| 2 | 4756.0 | 4885.1 | 5492.0 | 3205.0 | 3008.9 | 3816.0 | 4589.3 | 4613.7 | 4895.0 |
| 3 | 4800.5 | 4798.4 | 5446.0 | 4547.9 | 4182.7 | 3878.0 | 4671.3 | 4586.8 | 4854.0 |
| 4 | 4803.3 | 4905.1 | 5306.0 | 2575.7 | 3881.3 | 3690.0 | 4547.3 | 4568.1 | 4850.0 |
| 5 | 4824.1 | 4968.0 | 5483.0 | 2763.9 | 3921.0 | 3710.0 | 4569.9 | 4572.0 | 4899.0 |
| 6 | 4884.1 | 4665.0 | 5452.0 | 4535.6 | 4147.0 | 3735.0 | 4694.6 | 4467.0 | 4889.0 |
| 7 | 4827.4 | 4894.1 | 5439.0 | 3751.6 | 3690.1 | 3678.0 | 4575.5 | 4667.6 | 4895.0 |
| 8 | 4789.8 | 4870.3 | 5433.0 | 3828.5 | 3710.4 | 3717.0 | 4542.8 | 4652.6 | 4876.0 |
| 9 | 4832.2 | 4756.3 | 5439.0 | 4534.5 | 4226.4 | 3669.0 | 4668.7 | 4577.1 | 4869.0 |
| 10 | 4699.6 | 4886.1 | 5572.0 | 3770.6 | 4228.7 | 3593.0 | 4506.3 | 4639.5 | 4894.0 |
| 11 | 4713.6 | 4896.1 | 5485.0 | 3823.1 | 4214.5 | 3683.0 | 4543.2 | 4542.9 | 4869.0 |
| 12 | 4812.1 | 4743.2 | 5580.0 | 4545.0 | 4311.8 | 3727.0 | 4663.9 | 4460.3 | 4890.0 |
| 13 | 4732.7 | 4845.1 | 5376.0 | 2631.2 | 2911.8 | 3849.0 | 4517.8 | 4566.9 | 4930.0 |
| 14 | 4726.6 | 4836.3 | 5456.0 | 2730.7 | 2991.3 | 3959.0 | 4541.8 | 4585.1 | 4961.0 |
| 15 | 4829.6 | 4639.4 | 5444.0 | 4539.9 | 3926.3 | 3959.0 | 4694.2 | 4498.0 | 4952.0 |
| 16 | 4696.0 | 4759.0 | 5456.0 | 3640.0 | 3982.0 | 3838.0 | 4526.0 | 4504.0 | 4931.0 |
| 17 | 4724.0 | 4739.0 | 5414.0 | 3691.0 | 3952.0 | 3908.0 | 4521.0 | 4480.0 | 4886.0 |
| 18 | 4730.0 | 4706.0 | 5433.0 | 4510.0 | 4460.0 | 3888.0 | 4610.0 | 4623.0 | 4911.0 |
| 19 | 4857.0 | 4797.0 | 5477.0 | 2889.0 | 3176.0 | 3218.0 | 4548.0 | 4569.0 | 4866.0 |
| 20 | 4857.0 | 4797.0 | 5466.0 | 2889.0 | 3176.0 | 3449.0 | 4548.0 | 4569.0 | 4911.0 |
| 21 | 4857.0 | 4797.0 | 5582.0 | 2889.0 | 3176.0 | 3278.0 | 4548.0 | 4569.0 | 4885.0 |
| Average | 4785.93 | 4812.84 | 5458.05 | 3598.00 | 3728.74 | 3718.90 | 4581.81 | 4568.36 | 4895.00 |
| SD | 58.89 | 85.93 | 65.27 | 729.44 | 516.70 | 200.59 | 61.07 | 59.31 | 29.43 |
| ค่าต่ำสุด | 4696.00 | 4639.40 | 5306.00 | 2575.70 | 2911.80 | 3218.00 | 4506.30 | 4460.30 | 4850.00 |
| ค่าสูงสุด | 4884.10 | 4968.00 | 5582.00 | 4547.90 | 4460.00 | 3959.00 | 4694.60 | 4667.60 | 4961.00 |

| Case no. | D ₁₀₀ | | | D ₉₅ | | | D ₉₀ | | |
|-----------|------------------|---------|---------|-----------------|---------|---------|-----------------|---------|---------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 3270.0 | 3015.0 | 4140.0 | 4476.0 | 4486.0 | 4539.0 | 4504.0 | 4560.0 | 4650.0 |
| 2 | 3195.0 | 3000.0 | 4200.0 | 4442.0 | 4412.0 | 4571.0 | 4488.0 | 4515.0 | 4660.0 |
| 3 | 4545.0 | 4170.0 | 4380.0 | 4597.0 | 4459.0 | 4531.0 | 4608.0 | 4487.0 | 4630.0 |
| 4 | 2580.0 | 3885.0 | 4110.0 | 4223.0 | 4326.0 | 4530.0 | 4417.0 | 4368.0 | 4650.0 |
| 5 | 2760.0 | 3900.0 | 4150.0 | 4425.0 | 4335.0 | 4588.0 | 4470.0 | 4396.0 | 4710.0 |
| 6 | 4530.0 | 4200.0 | 4120.0 | 4592.0 | 4371.0 | 4584.0 | 4609.0 | 4391.0 | 4680.0 |
| 7 | 3750.0 | 3690.0 | 3950.0 | 4470.0 | 4503.0 | 4492.0 | 4486.0 | 4588.0 | 4630.0 |
| 8 | 3825.0 | 3705.0 | 4070.0 | 4423.0 | 4504.0 | 4479.0 | 4447.0 | 4557.0 | 4630.0 |
| 9 | 4530.0 | 4230.0 | 3880.0 | 4558.0 | 4477.0 | 4442.0 | 4577.0 | 4503.0 | 4570.0 |
| 10 | 3795.0 | 2470.0 | 4060.0 | 4305.0 | 4527.0 | 4501.0 | 4368.0 | 4560.0 | 4650.0 |
| 11 | 3840.0 | 4215.0 | 4090.0 | 4380.0 | 4478.0 | 4504.0 | 4417.0 | 4460.0 | 4630.0 |
| 12 | 4530.0 | 4305.0 | 4010.0 | 4593.0 | 4435.0 | 4517.0 | 4606.0 | 4460.0 | 4650.0 |
| 13 | 2625.0 | 2910.0 | 4280.0 | 4335.0 | 4412.0 | 4644.0 | 4431.0 | 4495.0 | 4760.0 |
| 14 | 2730.0 | 2985.0 | 4270.0 | 4387.0 | 4448.0 | 4688.0 | 4484.0 | 4514.0 | 4760.0 |
| 15 | 4545.0 | 3975.0 | 4280.0 | 4605.0 | 4375.0 | 4679.0 | 4635.0 | 4411.0 | 4770.0 |
| 16 | 3645.0 | 3975.0 | 4260.0 | 4455.0 | 4368.0 | 4581.0 | 4476.0 | 4380.0 | 4690.0 |
| 17 | 3690.0 | 3945.0 | 4180.0 | 4455.0 | 4348.0 | 4545.0 | 4470.0 | 4372.0 | 4660.0 |
| 18 | 4500.0 | 4455.0 | 4150.0 | 4560.0 | 4545.0 | 4584.0 | 4577.0 | 4567.0 | 4710.0 |
| 19 | 2880.0 | 3195.0 | 3860.0 | 4467.0 | 4468.0 | 4449.0 | 4500.0 | 4507.0 | 4590.0 |
| 20 | 2880.0 | 3195.0 | 3850.0 | 4467.0 | 4468.0 | 4395.0 | 4500.0 | 4507.0 | 4600.0 |
| 21 | 2880.0 | 3195.0 | 3870.0 | 4467.0 | 4468.0 | 4350.0 | 4500.0 | 4507.0 | 4590.0 |
| Average | 3596.43 | 3648.33 | 4102.86 | 4461.05 | 4438.71 | 4533.00 | 4503.33 | 4481.19 | 4660.48 |
| SD | 729.76 | 572.50 | 154.21 | 101.37 | 64.26 | 84.98 | 72.94 | 70.02 | 56.52 |
| ค่าต่ำสุด | 2580.00 | 2470.00 | 3850.00 | 4223.00 | 4326.00 | 4350.00 | 4368.00 | 4368.00 | 4570.00 |
| ค่าสูงสุด | 4545.00 | 4455.00 | 4380.00 | 4605.00 | 4545.00 | 4688.00 | 4635.00 | 4588.00 | 4770.00 |

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| Case no. | D ₅₀ | | | V ₁₀₀ | | |
|-----------|-----------------|---------|---------|------------------|-------|--------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 4609.0 | 4628.0 | 4913.0 | 90.9 | 94.3 | 97.6 |
| 2 | 4613.0 | 4636.0 | 4921.0 | 86.3 | 90.9 | 97.0 |
| 3 | 4661.0 | 4581.0 | 4903.0 | 100.0 | 87.5 | 97.6 |
| 4 | 4601.0 | 4597.0 | 4902.0 | 73.4 | 72.5 | 96.7 |
| 5 | 4604.0 | 4590.0 | 4954.0 | 81.6 | 80.3 | 97.6 |
| 6 | 4687.0 | 4461.0 | 4910.0 | 100.0 | 99.9 | 96.6 |
| 7 | 4579.0 | 4669.0 | 4934.0 | 82.2 | 95.2 | 95.5 |
| 8 | 4536.0 | 4655.0 | 4940.0 | 65.2 | 90.9 | 95.2 |
| 9 | 4669.0 | 4582.0 | 4900.0 | 100.0 | 90.9 | 94.0 |
| 10 | 4534.0 | 4638.0 | 4934.0 | 64.9 | 96.9 | 96.1 |
| 11 | 4561.0 | 4653.0 | 4950.0 | 71.9 | 95.4 | 96.2 |
| 12 | 4656.0 | 4597.0 | 4913.0 | 100.0 | 92.9 | 96.1 |
| 13 | 4557.0 | 4581.0 | 4953.0 | 73.6 | 89.1 | 98.5 |
| 14 | 4578.0 | 4607.0 | 4983.0 | 85.4 | 99.2 | 99.5 |
| 15 | 4692.0 | 4494.0 | 4977.0 | 100.0 | 99.0 | 99.1 |
| 16 | 4550.0 | 4501.0 | 4957.0 | 82.0 | 80.2 | 97.0 |
| 17 | 4536.0 | 4477.0 | 4919.0 | 78.8 | 83.1 | 96.7 |
| 18 | 4609.0 | 4622.0 | 4960.0 | 100.0 | 99.3 | 97.3 |
| 19 | 4564.0 | 4581.0 | 4930.0 | 90.9 | 91.6 | 92.8 |
| 20 | 4564.0 | 4581.0 | 4985.0 | 90.9 | 91.6 | 94.1 |
| 21 | 4564.0 | 4581.0 | 4946.0 | 90.9 | 91.6 | 93.1 |
| Average | 4596.38 | 4586.29 | 4937.33 | 86.14 | 91.06 | 96.40 |
| SD | 50.48 | 58.50 | 26.48 | 11.75 | 7.14 | 1.80 |
| ค่าต่ำสุด | 4534.00 | 4461.00 | 4900.00 | 64.90 | 72.50 | 92.80 |
| ค่าสูงสุด | 4692.00 | 4669.00 | 4985.00 | 100.00 | 99.90 | 99.50 |

Bladder

| Case no. | D _{max} | | | D _{min} | | | D _{mean} | | |
|-----------|------------------|---------|---------|------------------|---------|---------|-------------------|---------|---------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 4662.8 | 4771.7 | 5330.0 | 4444.1 | 4416.9 | 2888.0 | 4541.6 | 4515.3 | 4170.0 |
| 2 | 4662.8 | 4771.7 | 5253.0 | 4444.1 | 4416.9 | 2066.0 | 4541.6 | 4515.3 | 4110.0 |
| 3 | 4662.8 | 4771.7 | 5328.0 | 4444.1 | 4416.9 | 2356.0 | 4541.6 | 4515.3 | 4240.0 |
| 4 | 4931.3 | 4926.0 | 5155.0 | 4621.4 | 4654.0 | 2155.0 | 4780.6 | 4719.0 | 3627.0 |
| 5 | 4931.3 | 4926.0 | 5148.0 | 4621.4 | 4654.0 | 2221.0 | 4780.6 | 4719.0 | 3712.0 |
| 6 | 4931.3 | 4926.0 | 5002.0 | 4621.4 | 4654.0 | 2034.0 | 4780.6 | 4719.0 | 3486.0 |
| 7 | 4725.0 | 4749.6 | 5288.0 | 4575.7 | 4441.9 | 2337.0 | 4647.9 | 4555.4 | 4135.0 |
| 8 | 4725.0 | 4749.6 | 5329.0 | 4575.7 | 4441.9 | 1964.0 | 4647.9 | 4555.4 | 3922.0 |
| 9 | 4725.0 | 4749.6 | 5236.0 | 4575.7 | 4441.9 | 2087.0 | 4647.9 | 4555.4 | 4108.0 |
| 10 | 4711.6 | 4783.4 | 5199.0 | 4508.5 | 4490.4 | 2464.0 | 4611.0 | 4580.5 | 3976.0 |
| 11 | 4711.6 | 4783.4 | 5256.0 | 4508.5 | 4490.4 | 2377.0 | 4611.0 | 4580.5 | 4066.0 |
| 12 | 4711.6 | 4783.4 | 5193.0 | 4508.5 | 4490.4 | 2399.0 | 4611.0 | 4580.5 | 4117.0 |
| 13 | 4739.7 | 4756.9 | 5047.0 | 4549.3 | 4428.4 | 489.0 | 4651.4 | 4564.8 | 3326.0 |
| 14 | 4739.7 | 4756.9 | 5115.0 | 4549.3 | 4428.4 | 1747.0 | 4651.4 | 4564.8 | 3466.0 |
| 15 | 4739.7 | 4756.9 | 5237.0 | 4549.3 | 4428.4 | 2288.0 | 4651.4 | 4564.8 | 3775.0 |
| 16 | 4603.0 | 4520.0 | 5337.0 | 4400.0 | 2539.0 | 2376.0 | 4500.0 | 4433.0 | 4008.0 |
| 17 | 4603.0 | 4520.0 | 5189.0 | 4400.0 | 2539.0 | 2191.0 | 4500.0 | 4433.0 | 3757.0 |
| 18 | 4603.0 | 4520.0 | 5094.0 | 4400.0 | 2539.0 | 1941.0 | 4500.0 | 4433.0 | 3433.0 |
| 19 | 4731.0 | 4540.0 | 4566.0 | 4522.0 | 4176.0 | 268.0 | 4602.0 | 4423.0 | 1434.0 |
| 20 | 4731.0 | 4540.0 | 5307.0 | 4522.0 | 4176.0 | 508.0 | 4602.0 | 4423.0 | 3123.0 |
| 21 | 4731.0 | 4540.0 | 4531.0 | 4522.0 | 4176.0 | 268.0 | 4602.0 | 4423.0 | 1430.0 |
| Average | 4729.20 | 4721.09 | 5149.52 | 4517.29 | 4163.80 | 1877.33 | 4619.21 | 4541.57 | 3591.48 |
| SD | 96.14 | 136.25 | 221.19 | 71.93 | 692.66 | 779.55 | 85.30 | 95.08 | 783.06 |
| ค่าต่ำสุด | 4603.00 | 4520.00 | 4531.00 | 4400.00 | 2539.00 | 268.00 | 4500.00 | 4423.00 | 1430.00 |
| ค่าสูงสุด | 4931.30 | 4926.00 | 5337.00 | 4621.40 | 4654.00 | 2888.00 | 4780.60 | 4719.00 | 4240.00 |

| Case no. | D ₉₅ | | | D ₅₀ | | | V ₁₀₀ | | |
|-----------|-----------------|---------|---------|-----------------|---------|---------|------------------|--------|--------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 4477.0 | 4462.5 | 2875.0 | 4526.0 | 4512.0 | 4147.0 | 85.3 | 55.4 | 39.9 |
| 2 | 4477.0 | 4462.5 | 2796.0 | 4526.0 | 4512.0 | 4257.0 | 85.3 | 55.4 | 38.4 |
| 3 | 4477.0 | 4462.5 | 2968.0 | 4526.0 | 4512.0 | 4369.0 | 85.3 | 55.4 | 43.8 |
| 4 | 4677.0 | 4615.0 | 2577.0 | 4779.0 | 4699.0 | 3677.0 | 100.0 | 100.0 | 38.1 |
| 5 | 4677.0 | 4615.0 | 2610.0 | 4779.0 | 4699.0 | 3748.0 | 100.0 | 100.0 | 21.5 |
| 6 | 4677.0 | 4615.0 | 2527.0 | 4779.0 | 4699.0 | 3552.0 | 100.0 | 100.0 | 12.7 |
| 7 | 4605.0 | 4463.0 | 2851.0 | 4648.0 | 4568.0 | 4234.0 | 100.0 | 82.8 | 35.5 |
| 8 | 4605.0 | 4463.0 | 2597.0 | 4648.0 | 4568.0 | 3968.0 | 100.0 | 82.8 | 28.7 |
| 9 | 4605.0 | 4463.0 | 2871.0 | 4648.0 | 4568.0 | 4200.0 | 100.0 | 82.8 | 37.1 |
| 10 | 4537.0 | 4513.0 | 2956.0 | 4613.0 | 4568.0 | 3997.0 | 100.0 | 99.1 | 25.7 |
| 11 | 4537.0 | 4513.0 | 2987.0 | 4613.0 | 4568.0 | 4043.0 | 100.0 | 99.1 | 29.9 |
| 12 | 4537.0 | 4513.0 | 3074.0 | 4613.0 | 4568.0 | 4112.0 | 100.0 | 99.1 | 33.3 |
| 13 | 4596.0 | 4496.0 | 1748.0 | 4654.0 | 4551.0 | 3358.0 | 100.0 | 91.7 | 11.2 |
| 14 | 4596.0 | 4496.0 | 2264.0 | 4654.0 | 4551.0 | 3440.0 | 100.0 | 91.7 | 13.7 |
| 15 | 4596.0 | 4496.0 | 2635.0 | 4654.0 | 4551.0 | 3733.0 | 100.0 | 91.7 | 23.3 |
| 16 | 4444.0 | 4405.0 | 2719.0 | 4497.0 | 4480.0 | 4050.0 | 95.8 | 54.4 | 32.3 |
| 17 | 4444.0 | 4405.0 | 2588.0 | 4497.0 | 4480.0 | 3754.0 | 95.8 | 54.4 | 21.1 |
| 18 | 4444.0 | 4405.0 | 2410.0 | 4497.0 | 4480.0 | 3372.0 | 95.8 | 54.4 | 10.3 |
| 19 | 4525.0 | 4364.0 | 318.0 | 4601.0 | 4422.0 | 854.0 | 100.0 | 74.8 | 0.3 |
| 20 | 4525.0 | 4364.0 | 918.0 | 4601.0 | 4422.0 | 3312.0 | 100.0 | 74.8 | 11.2 |
| 21 | 4525.0 | 4364.0 | 324.0 | 4601.0 | 4422.0 | 860.0 | 100.0 | 74.8 | 0.0 |
| Average | 4551.57 | 4474.07 | 2362.52 | 4616.86 | 4542.86 | 3573.19 | 97.30 | 79.74 | 24.19 |
| SD | 76.10 | 76.49 | 831.14 | 87.91 | 82.36 | 958.17 | 5.23 | 18.15 | 13.17 |
| ค่าต่ำสุด | 4444.00 | 4364.00 | 318.00 | 4497.00 | 4422.00 | 854.00 | 85.30 | 54.40 | 0.00 |
| ค่าสูงสุด | 4677.00 | 4615.00 | 3074.00 | 4779.00 | 4699.00 | 4369.00 | 100.00 | 100.00 | 43.80 |

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Rectum

| Case no. | D _{max} | | | D _{min} | | | D _{mean} | | |
|-----------|------------------|---------|---------|------------------|---------|---------|-------------------|---------|---------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 4715.3 | 4692.5 | 5330.0 | 4462.9 | 4272.3 | 979.0 | 4546.0 | 4551.6 | 4170.0 |
| 2 | 4715.3 | 4692.5 | 5152.0 | 4462.9 | 4272.3 | 1394.0 | 4546.0 | 4551.6 | 3951.0 |
| 3 | 4715.3 | 4692.5 | 5290.0 | 4462.9 | 4272.3 | 1805.0 | 4546.0 | 4551.6 | 4016.0 |
| 4 | 4945.6 | 4622.0 | 5106.0 | 3880.5 | 3911.0 | 596.0 | 4715.5 | 4424.0 | 3654.0 |
| 5 | 4945.6 | 4622.0 | 5126.0 | 3880.5 | 3911.0 | 599.0 | 4715.5 | 4424.0 | 3633.0 |
| 6 | 4945.6 | 4622.0 | 5043.0 | 3880.5 | 3911.0 | 555.0 | 4715.5 | 4424.0 | 3363.0 |
| 7 | 4605.0 | 4724.5 | 5256.0 | 4027.2 | 3621.6 | 323.0 | 4652.4 | 4449.5 | 2790.0 |
| 8 | 4605.0 | 4724.5 | 5351.0 | 4027.2 | 3621.6 | 313.0 | 4652.4 | 4449.5 | 2758.0 |
| 9 | 4605.0 | 4724.5 | 5369.0 | 4027.2 | 3621.6 | 320.0 | 4652.4 | 4449.5 | 2770.0 |
| 10 | 4755.1 | 4651.2 | 5289.0 | 4440.6 | 2846.4 | 409.0 | 4615.6 | 4449.3 | 3541.0 |
| 11 | 4755.1 | 4651.2 | 5170.0 | 4440.6 | 2846.4 | 432.0 | 4615.6 | 4449.3 | 3607.0 |
| 12 | 4755.1 | 4651.2 | 5233.0 | 4440.6 | 2846.4 | 1054.0 | 4615.6 | 4449.3 | 3744.0 |
| 13 | 4788.6 | 4602.0 | 5276.0 | 4339.0 | 2983.3 | 250.0 | 4645.4 | 4405.6 | 2919.0 |
| 14 | 4788.6 | 4602.0 | 5856.0 | 4339.0 | 2983.3 | 287.0 | 4645.4 | 4405.6 | 3193.0 |
| 15 | 4788.6 | 4602.0 | 5046.0 | 4339.0 | 2983.3 | 317.0 | 4645.4 | 4405.6 | 3291.0 |
| 16 | 4569.0 | 4591.0 | 5119.0 | 4213.0 | 2342.0 | 348.0 | 4445.0 | 4193.0 | 3454.0 |
| 17 | 4569.0 | 4591.0 | 5234.0 | 4213.0 | 2342.0 | 337.0 | 4445.0 | 4193.0 | 3434.0 |
| 18 | 4569.0 | 4591.0 | 4995.0 | 4213.0 | 2342.0 | 243.0 | 4445.0 | 4193.0 | 2935.0 |
| 19 | 4708.0 | 4631.0 | 5193.0 | 4343.0 | 2781.0 | 214.0 | 4580.0 | 4434.0 | 3177.0 |
| 20 | 4708.0 | 4631.0 | 5321.0 | 4343.0 | 2781.0 | 298.0 | 4580.0 | 4434.0 | 3545.0 |
| 21 | 4708.0 | 4631.0 | 5213.0 | 4343.0 | 2781.0 | 214.0 | 4580.0 | 4434.0 | 3139.0 |
| Average | 4726.66 | 4644.89 | 5236.57 | 4243.74 | 3251.09 | 537.48 | 4599.99 | 4415.29 | 3384.95 |
| SD | 117.93 | 46.00 | 177.06 | 206.94 | 659.38 | 424.51 | 82.82 | 103.08 | 412.24 |
| ค่าต่ำสุด | 4569.00 | 4591.00 | 4995.00 | 3880.50 | 2342.00 | 214.00 | 4445.00 | 4193.00 | 2758.00 |
| ค่าสูงสุด | 4945.60 | 4724.50 | 5856.00 | 4462.90 | 4272.30 | 1805.00 | 4715.50 | 4551.60 | 4170.00 |

| Case no. | D ₉₅ | | | D ₅₀ | | | V ₁₀₀ | | |
|-----------|-----------------|---------|---------|-----------------|---------|---------|------------------|-------|--------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 4507.0 | 4391.0 | 2017.0 | 4557.0 | 4566.0 | 3662.0 | 97.7 | 70.6 | 27.8 |
| 2 | 4507.0 | 4391.0 | 2717.0 | 4557.0 | 4566.0 | 3917.0 | 97.7 | 70.6 | 27.8 |
| 3 | 4507.0 | 4391.0 | 2648.0 | 4557.0 | 4566.0 | 4105.0 | 97.7 | 70.6 | 37.4 |
| 4 | 4498.0 | 4232.0 | 2015.0 | 4742.0 | 4440.0 | 3631.0 | 94.6 | 30.4 | 29.3 |
| 5 | 4498.0 | 4232.0 | 2001.0 | 4742.0 | 4440.0 | 3633.0 | 94.6 | 30.4 | 14.5 |
| 6 | 4498.0 | 4232.0 | 1856.0 | 4742.0 | 4440.0 | 3359.0 | 94.6 | 30.4 | 6.9 |
| 7 | 4382.0 | 4056.0 | 376.0 | 4678.0 | 4473.0 | 3361.0 | 91.2 | 38.9 | 26.6 |
| 8 | 4382.0 | 4056.0 | 365.0 | 4678.0 | 4473.0 | 3349.0 | 91.2 | 38.9 | 26.0 |
| 9 | 4382.0 | 4056.0 | 380.0 | 4678.0 | 4473.0 | 3295.0 | 91.2 | 38.9 | 27.5 |
| 10 | 4515.0 | 4110.0 | 1223.0 | 4616.0 | 4507.0 | 3598.0 | 96.1 | 52.1 | 10.9 |
| 11 | 4515.0 | 4110.0 | 1299.0 | 4616.0 | 4507.0 | 3691.0 | 96.1 | 52.1 | 13.9 |
| 12 | 4515.0 | 4110.0 | 2758.0 | 4616.0 | 4507.0 | 3694.0 | 96.1 | 52.1 | 16.9 |
| 13 | 4536.0 | 3975.0 | 366.0 | 4647.0 | 4473.0 | 3347.0 | 96.7 | 33.2 | 5.7 |
| 14 | 4536.0 | 3975.0 | 437.0 | 4647.0 | 4473.0 | 3328.0 | 96.7 | 33.2 | 5.7 |
| 15 | 4536.0 | 3975.0 | 475.0 | 4647.0 | 4473.0 | 3439.0 | 96.7 | 33.2 | 11.8 |
| 16 | 4406.0 | 4060.0 | 587.0 | 4461.0 | 4347.0 | 3644.0 | 87.1 | 44.4 | 16.0 |
| 17 | 4406.0 | 4060.0 | 571.0 | 4461.0 | 4347.0 | 3547.0 | 87.1 | 44.4 | 14.5 |
| 18 | 4406.0 | 4060.0 | 351.0 | 4461.0 | 4347.0 | 3270.0 | 87.1 | 44.4 | 5.1 |
| 19 | 4432.0 | 4155.0 | 274.0 | 4592.0 | 4507.0 | 3736.0 | 87.5 | 53.5 | 26.9 |
| 20 | 4432.0 | 4155.0 | 372.0 | 4592.0 | 4507.0 | 4056.0 | 87.5 | 53.5 | 30.5 |
| 21 | 4432.0 | 4155.0 | 268.0 | 4592.0 | 4507.0 | 3707.0 | 87.5 | 53.5 | 25.7 |
| Average | 4468.00 | 4139.86 | 1112.19 | 4613.29 | 4473.29 | 3589.00 | 92.99 | 46.16 | 19.40 |
| SD | 57.17 | 130.35 | 917.42 | 85.48 | 64.72 | 241.11 | 4.18 | 13.18 | 9.76 |
| ค่าต่ำสุด | 4382.00 | 3975.00 | 268.00 | 4461.00 | 4347.00 | 3270.00 | 87.10 | 30.40 | 5.10 |
| ค่าสูงสุด | 4536.00 | 4391.00 | 2758.00 | 4742.00 | 4566.00 | 4105.00 | 97.70 | 70.60 | 37.40 |

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Small bowel

| Case no. | D _{max} | | | D _{min} | | | D _{mean} | | |
|-----------|------------------|---------|---------|------------------|--------|--------|-------------------|---------|---------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 4786.3 | 4881.0 | 5308.0 | 106.8 | 258.9 | 196.0 | 3362.1 | 3684.4 | 2517.0 |
| 2 | 4786.3 | 4881.0 | 5247.0 | 106.8 | 258.9 | 194.0 | 3362.1 | 3684.4 | 2562.0 |
| 3 | 4786.3 | 4881.0 | 5288.0 | 106.8 | 258.9 | 198.0 | 3362.1 | 3684.4 | 2511.0 |
| 4 | 4835.2 | 4862.0 | 4968.0 | 102.6 | 436.0 | 207.0 | 3237.5 | 3643.0 | 2026.0 |
| 5 | 4835.2 | 4862.0 | 5014.0 | 102.6 | 436.0 | 208.0 | 3237.5 | 3643.0 | 2040.0 |
| 6 | 4835.2 | 4862.0 | 5028.0 | 102.6 | 436.0 | 206.0 | 3237.5 | 3643.0 | 2036.0 |
| 7 | 4789.4 | 4980.7 | 5295.0 | 925.0 | 136.2 | 126.0 | 2988.0 | 3321.5 | 2398.0 |
| 8 | 4789.4 | 4980.7 | 5241.0 | 925.0 | 136.2 | 125.0 | 2988.0 | 3321.5 | 2392.0 |
| 9 | 4789.4 | 4980.7 | 5369.0 | 925.0 | 136.2 | 126.0 | 2988.0 | 3321.5 | 2365.0 |
| 10 | 4806.9 | 4891.9 | 5186.0 | 181.4 | 235.4 | 157.0 | 3508.1 | 3708.9 | 2231.0 |
| 11 | 4806.9 | 4891.9 | 4852.0 | 181.4 | 235.4 | 157.0 | 3508.1 | 3708.9 | 2205.0 |
| 12 | 4806.9 | 4891.9 | 4932.0 | 181.4 | 235.4 | 160.0 | 3508.1 | 3708.9 | 2213.0 |
| 13 | 4773.0 | 4843.4 | 5163.0 | 195.7 | 302.7 | 163.0 | 3211.5 | 3490.8 | 2233.0 |
| 14 | 4773.0 | 4843.4 | 5241.0 | 195.7 | 302.7 | 164.0 | 3211.5 | 3490.8 | 2245.0 |
| 15 | 4773.0 | 4843.4 | 5308.0 | 195.7 | 302.7 | 165.0 | 3211.5 | 3490.8 | 2248.0 |
| 16 | 4740.0 | 4683.0 | 4869.0 | 77.0 | 195.0 | 172.0 | 2637.0 | 2975.0 | 1866.0 |
| 17 | 4740.0 | 4683.0 | 4963.0 | 77.0 | 195.0 | 172.0 | 2637.0 | 2975.0 | 1885.0 |
| 18 | 4740.0 | 4683.0 | 5157.0 | 77.0 | 195.0 | 163.0 | 2637.0 | 2975.0 | 1868.0 |
| 19 | 4871.0 | 4701.0 | 5209.0 | 75.0 | 103.0 | 90.0 | 2798.0 | 2796.0 | 2028.0 |
| 20 | 4871.0 | 4701.0 | 5439.0 | 75.0 | 103.0 | 90.0 | 2798.0 | 2796.0 | 2112.0 |
| 21 | 4871.0 | 4701.0 | 5209.0 | 75.0 | 103.0 | 90.0 | 2798.0 | 2796.0 | 2028.0 |
| Average | 4800.26 | 4834.71 | 5156.48 | 237.64 | 238.17 | 158.52 | 3106.03 | 3374.23 | 2190.90 |
| SD | 40.54 | 101.32 | 169.09 | 291.12 | 105.55 | 38.13 | 296.09 | 344.36 | 212.96 |
| ค่าต่ำสุด | 4740.00 | 4683.00 | 4852.00 | 75.00 | 103.00 | 90.00 | 2637.00 | 2796.00 | 1866.00 |
| ค่าสูงสุด | 4871.00 | 4980.70 | 5439.00 | 925.00 | 436.00 | 208.00 | 3508.10 | 3708.90 | 2562.00 |

| Case no. | D ₉₅ | | | D ₅₀ | | | V ₁₀₀ | | |
|-----------|-----------------|---------|--------|-----------------|---------|---------|------------------|-------|--------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 195.0 | 975.0 | 527.0 | 4530.0 | 4489.0 | 2557.0 | 54.7 | 48.6 | 6.9 |
| 2 | 195.0 | 975.0 | 532.0 | 4530.0 | 4489.0 | 2593.0 | 54.7 | 48.6 | 6.6 |
| 3 | 195.0 | 975.0 | 552.0 | 4530.0 | 4489.0 | 2549.0 | 54.7 | 48.6 | 6.6 |
| 4 | 186.0 | 1591.0 | 615.0 | 4498.0 | 4131.0 | 1810.0 | 50.0 | 36.7 | 3.5 |
| 5 | 186.0 | 1591.0 | 621.0 | 4498.0 | 4131.0 | 1828.0 | 50.0 | 36.7 | 0.9 |
| 6 | 186.0 | 1591.0 | 615.0 | 4498.0 | 4131.0 | 1822.0 | 50.0 | 36.7 | 1.2 |
| 7 | 133.0 | 465.0 | 232.0 | 4552.0 | 4425.0 | 2630.0 | 56.2 | 48.7 | 3.9 |
| 8 | 133.0 | 465.0 | 232.0 | 4552.0 | 4425.0 | 2619.0 | 56.2 | 48.7 | 3.3 |
| 9 | 133.0 | 465.0 | 235.0 | 4552.0 | 4425.0 | 2580.0 | 56.2 | 48.7 | 3.3 |
| 10 | 307.0 | 626.0 | 303.0 | 5424.0 | 4529.0 | 2544.0 | 58.2 | 52.9 | 0.3 |
| 11 | 307.0 | 626.0 | 304.0 | 5424.0 | 4529.0 | 2513.0 | 58.2 | 52.9 | 0.6 |
| 12 | 307.0 | 626.0 | 304.0 | 5424.0 | 4529.0 | 2492.0 | 58.2 | 52.9 | 0.3 |
| 13 | 277.0 | 600.0 | 263.0 | 4509.0 | 4245.0 | 2410.0 | 52.5 | 39.8 | 0.9 |
| 14 | 277.0 | 600.0 | 269.0 | 4509.0 | 4245.0 | 2420.0 | 52.5 | 39.8 | 1.2 |
| 15 | 277.0 | 600.0 | 271.0 | 4509.0 | 4245.0 | 2398.0 | 52.5 | 39.8 | 1.5 |
| 16 | 127.0 | 598.0 | 361.0 | 4330.0 | 3982.0 | 1625.0 | 49.9 | 36.6 | 0.6 |
| 17 | 127.0 | 598.0 | 370.0 | 4330.0 | 3982.0 | 1681.0 | 49.9 | 36.6 | 0.3 |
| 18 | 127.0 | 598.0 | 317.0 | 4330.0 | 3982.0 | 1618.0 | 49.9 | 36.6 | 0.6 |
| 19 | 124.0 | 157.0 | 156.0 | 4526.0 | 4035.0 | 2166.0 | 55.3 | 32.3 | 3.6 |
| 20 | 124.0 | 157.0 | 164.0 | 4526.0 | 4035.0 | 2263.0 | 55.3 | 32.3 | 4.5 |
| 21 | 124.0 | 157.0 | 156.0 | 4526.0 | 4035.0 | 2166.0 | 55.3 | 32.3 | 0.0 |
| Average | 192.71 | 716.00 | 352.33 | 4624.14 | 4262.29 | 2251.62 | 53.83 | 42.23 | 2.41 |
| SD | 70.17 | 431.91 | 157.86 | 341.87 | 210.99 | 364.98 | 2.99 | 7.38 | 2.27 |
| ค่าต่ำสุด | 124.00 | 157.00 | 156.00 | 4330.00 | 3982.00 | 1618.00 | 49.90 | 32.30 | 0.00 |
| ค่าสูงสุด | 307.00 | 1591.00 | 621.00 | 5424.00 | 4529.00 | 2630.00 | 58.20 | 52.90 | 6.90 |

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Femoral heads

| Case no. | D _{max} | | | D _{min} | | | D _{mean} | | |
|-----------|------------------|---------|---------|------------------|---------|--------|-------------------|---------|---------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 4441.8 | 4534.5 | 3477.0 | 179.5 | 2561.0 | 799.0 | 1889.0 | 2997.2 | 1788.0 |
| 2 | 4476.6 | 4586.0 | 3292.0 | 208.9 | 2554.8 | 742.0 | 2061.7 | 3075.0 | 1590.0 |
| 3 | 4459.2 | 4560.3 | 3262.0 | 194.2 | 2557.9 | 797.0 | 1975.4 | 3036.1 | 1738.0 |
| 4 | 4406.9 | 4615.0 | 3724.0 | 183.4 | 2637.0 | 732.0 | 1564.0 | 3296.0 | 1927.0 |
| 5 | 4537.6 | 4684.0 | 3799.0 | 203.3 | 2638.0 | 745.0 | 2036.2 | 3515.0 | 2002.0 |
| 6 | 4472.3 | 4649.5 | 3802.0 | 193.4 | 2637.5 | 723.0 | 1800.1 | 3405.5 | 1898.0 |
| 7 | 4426.1 | 4618.7 | 3205.0 | 567.0 | 2604.6 | 481.0 | 1012.6 | 3118.7 | 1494.0 |
| 8 | 4417.0 | 4649.7 | 3250.0 | 499.0 | 2603.1 | 282.0 | 1025.3 | 3156.0 | 1387.0 |
| 9 | 4421.6 | 4634.2 | 3190.0 | 533.0 | 2603.9 | 412.0 | 1019.0 | 3137.4 | 1554.0 |
| 10 | 4401.2 | 4610.7 | 4026.0 | 208.7 | 760.6 | 531.0 | 1913.3 | 3373.7 | 1892.0 |
| 11 | 4420.4 | 4619.5 | 4429.0 | 199.9 | 782.0 | 584.0 | 1903.5 | 3397.6 | 2002.0 |
| 12 | 4410.8 | 4615.1 | 3948.0 | 204.3 | 771.3 | 644.0 | 1908.4 | 3385.7 | 2023.0 |
| 13 | 4313.4 | 4527.8 | 3726.0 | 208.1 | 1904.8 | 212.0 | 1430.1 | 3136.0 | 1311.0 |
| 14 | 4371.9 | 4517.0 | 4456.0 | 206.8 | 1623.8 | 254.0 | 1364.4 | 3158.1 | 1432.0 |
| 15 | 4342.7 | 4522.4 | 3899.0 | 207.5 | 1764.3 | 293.0 | 1397.3 | 3147.1 | 1540.0 |
| 16 | 4411.0 | 4551.0 | 3275.0 | 215.0 | 2486.0 | 748.0 | 2620.0 | 3697.0 | 1788.0 |
| 17 | 4396.0 | 4561.0 | 3228.0 | 227.0 | 2443.0 | 643.0 | 2617.0 | 3697.0 | 1586.0 |
| 18 | 4403.5 | 4556.0 | 3363.0 | 221.0 | 2464.5 | 595.0 | 2618.5 | 3697.0 | 1349.0 |
| 19 | 4376.0 | 4529.0 | 2794.0 | 45.0 | 1724.0 | 101.0 | 880.0 | 2926.0 | 724.0 |
| 20 | 4376.0 | 4529.0 | 2921.0 | 45.0 | 1724.0 | 130.0 | 880.0 | 2926.0 | 970.0 |
| 21 | 4376.0 | 4529.0 | 2794.0 | 45.0 | 1724.0 | 101.0 | 880.0 | 2926.0 | 724.0 |
| Average | 4412.28 | 4580.92 | 3517.14 | 228.33 | 2074.76 | 502.33 | 1656.94 | 3247.81 | 1558.05 |
| SD | 48.77 | 50.98 | 474.91 | 140.13 | 661.13 | 246.64 | 578.45 | 252.72 | 387.62 |
| ค่าต่ำสุด | 4313.40 | 4517.00 | 2794.00 | 45.00 | 760.60 | 101.00 | 880.00 | 2926.00 | 724.00 |
| ค่าสูงสุด | 4537.60 | 4684.00 | 4456.00 | 567.00 | 2638.00 | 799.00 | 2620.00 | 3697.00 | 2023.00 |

| Case no. | D ₉₅ | | | D ₅₀ | | | V ₁₀₀ | | |
|-----------|-----------------|---------|---------|-----------------|---------|---------|------------------|-------|--------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 223.0 | 2587.0 | 1122.0 | 1380.0 | 2683.0 | 1711.0 | 0.0 | 1.2 | 0.3 |
| 2 | 253.0 | 2614.0 | 968.0 | 1680.0 | 2707.0 | 1523.0 | 0.0 | 1.2 | 0.0 |
| 3 | 238.0 | 2600.5 | 1121.0 | 1530.0 | 2695.0 | 1637.0 | 0.0 | 1.2 | 0.0 |
| 4 | 233.0 | 2707.0 | 616.0 | 750.0 | 2869.0 | 1861.0 | 0.2 | 13.6 | 0.0 |
| 5 | 254.0 | 2715.0 | 1069.0 | 1560.0 | 3270.0 | 1949.0 | 0.2 | 13.6 | 0.0 |
| 6 | 243.5 | 2711.0 | 877.0 | 1155.0 | 3069.5 | 1804.0 | 0.2 | 13.6 | 0.0 |
| 7 | 78.0 | 2670.0 | 669.0 | 252.0 | 2857.0 | 1409.0 | 0.0 | 5.9 | 0.0 |
| 8 | 74.0 | 2690.0 | 580.0 | 241.0 | 2906.0 | 1282.0 | 0.0 | 6.2 | 0.0 |
| 9 | 76.0 | 2680.0 | 665.0 | 246.5 | 2881.5 | 1625.0 | 0.0 | 6.1 | 0.0 |
| 10 | 251.0 | 1935.0 | 969.0 | 1140.0 | 3067.0 | 1787.0 | 0.0 | 18.8 | 0.0 |
| 11 | 248.0 | 2325.0 | 1014.0 | 1162.0 | 3059.0 | 1900.0 | 0.0 | 18.3 | 0.2 |
| 12 | 249.5 | 2130.0 | 1139.0 | 1151.0 | 3063.0 | 1904.0 | 0.0 | 18.6 | 0.0 |
| 13 | 213.0 | 2623.0 | 280.0 | 660.0 | 2798.0 | 1017.0 | 0.0 | 0.2 | 0.0 |
| 14 | 257.0 | 2627.0 | 281.0 | 585.0 | 2790.0 | 1188.0 | 0.0 | 0.8 | 0.0 |
| 15 | 235.0 | 2625.0 | 617.0 | 622.5 | 2794.0 | 1358.0 | 0.0 | 0.5 | 0.0 |
| 16 | 298.0 | 2624.0 | 1072.0 | 2000.0 | 2886.0 | 1726.0 | 0.0 | 4.8 | 0.0 |
| 17 | 295.0 | 2587.0 | 813.0 | 2060.0 | 2902.0 | 1586.0 | 0.0 | 4.1 | 0.0 |
| 18 | 296.5 | 2605.5 | 708.0 | 2030.0 | 2894.0 | 1307.0 | 0.0 | 4.5 | 0.0 |
| 19 | 62.0 | 2482.0 | 145.0 | 217.0 | 2685.0 | 547.0 | 0.0 | 0.2 | 0.0 |
| 20 | 62.0 | 2482.0 | 219.0 | 217.0 | 2685.0 | 787.0 | 0.0 | 0.2 | 0.0 |
| 21 | 62.0 | 2482.0 | 145.0 | 217.0 | 2685.0 | 547.0 | 0.0 | 0.2 | 0.0 |
| Average | 200.07 | 2547.71 | 718.52 | 993.14 | 2868.86 | 1450.24 | 0.02 | 6.36 | 0.02 |
| SD | 87.72 | 197.80 | 341.48 | 652.42 | 162.36 | 429.21 | 0.06 | 6.75 | 0.07 |
| ค่าต่ำสุด | 62.00 | 1935.00 | 145.00 | 217.00 | 2683.00 | 547.00 | 0.00 | 0.20 | 0.00 |
| ค่าสูงสุด | 298.00 | 2715.00 | 1139.00 | 2060.00 | 3270.00 | 1949.00 | 0.16 | 18.80 | 0.30 |

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Bone marrow

| Case no. | D _{max} | | | D _{min} | | | D _{mean} | | |
|-----------|------------------|---------|---------|------------------|--------|--------|-------------------|---------|---------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 4804.4 | 4740.9 | 5130.0 | 582.0 | 160.7 | 88.0 | 1888.6 | 3122.6 | 1859.0 |
| 2 | 4804.4 | 4740.9 | 5186.0 | 582.0 | 160.7 | 92.0 | 1888.6 | 3122.6 | 1817.0 |
| 3 | 4804.4 | 4740.9 | 4953.0 | 582.0 | 160.7 | 97.0 | 1888.6 | 3122.6 | 1867.0 |
| 4 | 4862.7 | 4743.7 | 5080.0 | 649.0 | 191.5 | 110.0 | 2792.8 | 3315.5 | 2043.0 |
| 5 | 4862.7 | 4743.7 | 5168.0 | 649.0 | 191.5 | 113.0 | 2792.8 | 3315.5 | 2072.0 |
| 6 | 4862.7 | 4743.7 | 4737.0 | 649.0 | 191.5 | 104.0 | 2792.8 | 3315.5 | 2017.0 |
| 7 | 4902.5 | 4892.1 | 4704.0 | 563.0 | 227.2 | 71.0 | 2885.4 | 3338.9 | 1983.0 |
| 8 | 4902.5 | 4892.1 | 4738.0 | 563.0 | 227.2 | 68.0 | 2885.4 | 3338.9 | 1927.0 |
| 9 | 4902.5 | 4892.1 | 4794.0 | 563.0 | 227.2 | 72.0 | 2885.4 | 3338.9 | 1953.0 |
| 10 | 4836.7 | 4710.6 | 5341.0 | 119.3 | 143.2 | 77.0 | 2868.4 | 3150.4 | 1791.0 |
| 11 | 4836.7 | 4710.6 | 5438.0 | 119.3 | 143.2 | 80.0 | 2868.4 | 3150.4 | 1811.0 |
| 12 | 4836.7 | 4710.6 | 5411.0 | 119.3 | 143.2 | 91.0 | 2868.4 | 3150.4 | 1924.0 |
| 13 | 4813.9 | 4598.6 | 5712.0 | 142.8 | 273.2 | 77.0 | 2643.7 | 3153.5 | 1885.0 |
| 14 | 4813.9 | 4598.6 | 5603.0 | 142.8 | 273.2 | 86.0 | 2643.7 | 3153.5 | 1941.0 |
| 15 | 4813.9 | 4598.6 | 5626.0 | 142.8 | 273.2 | 90.0 | 2643.7 | 3153.5 | 1955.0 |
| 16 | 4732.0 | 4741.0 | 5508.0 | 43.0 | 93.0 | 62.0 | 2751.0 | 2874.0 | 1663.0 |
| 17 | 4732.0 | 4741.0 | 5508.0 | 43.0 | 93.0 | 58.0 | 2751.0 | 2874.0 | 1578.0 |
| 18 | 4732.0 | 4741.0 | 5544.0 | 43.0 | 93.0 | 49.0 | 2751.0 | 2874.0 | 1522.0 |
| 19 | 4663.0 | 4802.0 | 4580.0 | 45.0 | 86.4 | 50.0 | 2737.0 | 3304.9 | 1485.0 |
| 20 | 4663.0 | 4802.0 | 4531.0 | 45.0 | 86.4 | 62.0 | 2737.0 | 3304.9 | 1567.0 |
| 21 | 4663.0 | 4802.0 | 4580.0 | 45.0 | 86.4 | 50.0 | 2737.0 | 3304.9 | 1485.0 |
| Average | 4802.17 | 4746.99 | 5136.76 | 306.30 | 167.89 | 78.43 | 2652.41 | 3179.97 | 1816.43 |
| SD | 76.83 | 84.42 | 392.92 | 262.29 | 64.89 | 19.32 | 328.86 | 153.81 | 189.81 |
| ค่าต่ำสุด | 4663.00 | 4598.60 | 4531.00 | 43.00 | 86.40 | 49.00 | 1888.60 | 2874.00 | 1485.00 |
| ค่าสูงสุด | 4902.50 | 4892.10 | 5712.00 | 649.00 | 273.20 | 113.00 | 2885.40 | 3338.90 | 2072.00 |

| Case no. | D ₉₅ | | | D ₅₀ | | | V ₁₀₀ | | |
|-----------|-----------------|---------|--------|-----------------|---------|---------|------------------|-------|--------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 91.0 | 765.0 | 247.0 | 4289.0 | 2820.0 | 1918.0 | 31.0 | 14.5 | 0.6 |
| 2 | 91.0 | 765.0 | 249.0 | 4289.0 | 2820.0 | 1811.0 | 31.0 | 14.5 | 0.6 |
| 3 | 91.0 | 765.0 | 265.0 | 4289.0 | 2820.0 | 1887.0 | 31.0 | 14.5 | 0.0 |
| 4 | 101.0 | 1545.0 | 249.0 | 4245.0 | 3225.0 | 2049.0 | 27.6 | 13.6 | 0.3 |
| 5 | 101.0 | 1545.0 | 632.0 | 4245.0 | 3225.0 | 2070.0 | 27.6 | 13.6 | 0.6 |
| 6 | 101.0 | 1545.0 | 615.0 | 4245.0 | 3225.0 | 2078.0 | 27.6 | 13.6 | 0.3 |
| 7 | 71.0 | 1172.0 | 210.0 | 4275.0 | 3210.0 | 2145.0 | 37.2 | 21.6 | 0.0 |
| 8 | 71.0 | 1172.0 | 210.0 | 4275.0 | 3210.0 | 2111.0 | 37.2 | 21.6 | 0.0 |
| 9 | 71.0 | 1172.0 | 210.0 | 4275.0 | 3210.0 | 2145.0 | 37.2 | 21.6 | 0.0 |
| 10 | 226.0 | 825.0 | 218.0 | 4185.0 | 2998.0 | 1829.0 | 28.9 | 15.4 | 0.3 |
| 11 | 226.0 | 825.0 | 231.0 | 4185.0 | 2998.0 | 1857.0 | 28.9 | 15.4 | 0.3 |
| 12 | 226.0 | 825.0 | 291.0 | 4185.0 | 2998.0 | 1923.0 | 28.9 | 15.4 | 0.3 |
| 13 | 223.0 | 832.0 | 160.0 | 3645.0 | 2938.0 | 1953.0 | 18.3 | 9.9 | 3.0 |
| 14 | 223.0 | 832.0 | 179.0 | 3645.0 | 2938.0 | 1961.0 | 18.3 | 9.9 | 3.0 |
| 15 | 223.0 | 832.0 | 192.0 | 3645.0 | 2938.0 | 1979.0 | 18.3 | 9.9 | 2.7 |
| 16 | 83.0 | 276.0 | 158.0 | 4275.0 | 2705.0 | 1715.0 | 24.9 | 13.8 | 0.6 |
| 17 | 83.0 | 276.0 | 146.0 | 4275.0 | 2705.0 | 1658.0 | 24.9 | 13.8 | 0.6 |
| 18 | 83.0 | 276.0 | 124.0 | 4275.0 | 2705.0 | 1641.0 | 24.9 | 13.8 | 0.6 |
| 19 | 69.0 | 62.8 | 112.0 | 4110.0 | 2917.0 | 1619.0 | 17.9 | 18.1 | 0.0 |
| 20 | 69.0 | 62.8 | 142.0 | 4110.0 | 2917.0 | 1694.0 | 17.9 | 18.1 | 0.0 |
| 21 | 69.0 | 62.8 | 112.0 | 4110.0 | 2917.0 | 1619.0 | 17.9 | 18.1 | 0.0 |
| Average | 123.43 | 782.54 | 235.81 | 4146.29 | 2973.29 | 1888.67 | 26.54 | 15.27 | 0.66 |
| SD | 66.34 | 476.27 | 138.64 | 218.18 | 181.61 | 177.97 | 6.54 | 3.52 | 0.97 |
| ค่าต่ำสุด | 69.00 | 62.80 | 112.00 | 3645.00 | 2705.00 | 1619.00 | 17.90 | 9.90 | 0.00 |
| ค่าสูงสุด | 226.00 | 1545.00 | 632.00 | 4289.00 | 3225.00 | 2145.00 | 37.20 | 21.60 | 3.00 |

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| Case no. | V ₉₅ | | | V ₇₀ | | | V ₅₀ | | |
|-----------|-----------------|-------|--------|-----------------|-------|--------|-----------------|-------|--------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 50.4 | 23.0 | 0.9 | 60.5 | 42.6 | 7.6 | 63.7 | 87.6 | 35.0 |
| 2 | 50.4 | 23.0 | 1.2 | 60.5 | 42.6 | 6.9 | 63.7 | 87.6 | 31.1 |
| 3 | 50.4 | 23.0 | 0.6 | 60.5 | 42.6 | 6.9 | 63.7 | 87.6 | 33.2 |
| 4 | 48.9 | 27.9 | 0.6 | 58.6 | 48.9 | 11.2 | 61.3 | 90.4 | 39.3 |
| 5 | 48.9 | 27.9 | 0.9 | 58.6 | 48.9 | 11.5 | 61.3 | 90.4 | 29.0 |
| 6 | 48.9 | 27.9 | 0.6 | 58.6 | 48.9 | 10.3 | 61.3 | 90.4 | 27.2 |
| 7 | 49.9 | 30.3 | 0.3 | 60.3 | 51.1 | 11.5 | 64.1 | 91.9 | 44.1 |
| 8 | 49.9 | 30.3 | 0.3 | 60.3 | 51.1 | 11.5 | 64.1 | 91.9 | 42.0 |
| 9 | 49.9 | 30.3 | 0.3 | 60.3 | 51.1 | 11.5 | 64.1 | 91.9 | 44.1 |
| 10 | 47.6 | 25.8 | 1.2 | 59.1 | 45.6 | 10.6 | 62.6 | 83.0 | 33.5 |
| 11 | 47.6 | 25.8 | 0.9 | 59.1 | 45.6 | 10.6 | 62.6 | 83.0 | 34.1 |
| 12 | 47.6 | 25.8 | 0.9 | 59.1 | 45.6 | 11.8 | 62.6 | 83.0 | 35.6 |
| 13 | 39.7 | 24.0 | 4.8 | 53.2 | 46.1 | 18.9 | 57.7 | 84.6 | 39.9 |
| 14 | 39.7 | 24.0 | 4.5 | 53.2 | 46.1 | 19.3 | 57.7 | 84.6 | 40.5 |
| 15 | 39.7 | 24.0 | 4.5 | 53.2 | 46.1 | 17.5 | 57.7 | 84.6 | 40.2 |
| 16 | 50.1 | 24.8 | 0.9 | 59.2 | 41.7 | 3.6 | 61.5 | 83.3 | 26.6 |
| 17 | 50.1 | 24.8 | 0.9 | 59.2 | 41.7 | 3.3 | 61.5 | 83.3 | 23.0 |
| 18 | 50.1 | 24.8 | 0.6 | 59.2 | 41.7 | 3.9 | 61.5 | 83.3 | 24.8 |
| 19 | 45.5 | 28.7 | 0.3 | 58.1 | 46.7 | 4.5 | 61.2 | 84.3 | 24.8 |
| 20 | 45.5 | 28.7 | 0.6 | 58.1 | 46.7 | 4.5 | 61.2 | 84.3 | 26.6 |
| 21 | 45.5 | 28.7 | 0.0 | 58.1 | 46.7 | 4.2 | 61.2 | 84.3 | 25.1 |
| Average | 47.44 | 26.36 | 1.23 | 58.43 | 46.10 | 9.60 | 61.73 | 86.44 | 33.32 |
| SD | 3.63 | 2.54 | 1.44 | 2.33 | 3.12 | 4.87 | 2.01 | 3.39 | 6.95 |
| ค่าต่ำสุด | 39.70 | 23.00 | 0.00 | 53.20 | 41.70 | 3.30 | 57.70 | 83.00 | 23.00 |
| ค่าสูงสุด | 50.40 | 30.30 | 4.80 | 60.50 | 51.10 | 19.30 | 64.10 | 91.90 | 44.10 |

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| Case no. | V ₃₀ | | |
|-----------|-----------------|-------|--------|
| | Opposing | Box | IMRT 7 |
| 1 | 66.6 | 92.4 | 68.3 |
| 2 | 66.6 | 92.4 | 68.0 |
| 3 | 66.6 | 92.4 | 69.8 |
| 4 | 63.4 | 95.1 | 80.1 |
| 5 | 63.4 | 95.1 | 80.1 |
| 6 | 63.4 | 95.1 | 76.4 |
| 7 | 67.4 | 94.7 | 73.7 |
| 8 | 67.4 | 94.7 | 71.3 |
| 9 | 67.4 | 94.7 | 73.7 |
| 10 | 64.8 | 91.0 | 67.1 |
| 11 | 64.8 | 91.0 | 67.4 |
| 12 | 64.8 | 91.0 | 72.0 |
| 13 | 61.4 | 91.6 | 61.5 |
| 14 | 61.4 | 91.6 | 63.4 |
| 15 | 61.4 | 91.6 | 64.4 |
| 16 | 63.2 | 89.4 | 66.2 |
| 17 | 63.2 | 89.4 | 59.8 |
| 18 | 63.2 | 89.4 | 58.0 |
| 19 | 64.2 | 90.6 | 58.3 |
| 20 | 64.2 | 90.6 | 63.1 |
| 21 | 64.2 | 90.6 | 57.1 |
| Average | 64.43 | 92.11 | 67.60 |
| SD | 1.95 | 2.01 | 6.86 |
| ค่าต่ำสุด | 61.40 | 89.40 | 57.10 |
| ค่าสูงสุด | 67.40 | 95.10 | 80.10 |

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
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Body

| Case no. | D _{mean} | | | V _{3.33} = 150 cGy | | | V _{6.67} = 300 cGy | | |
|-----------|-------------------|---------|---------|-----------------------------|-------|--------|-----------------------------|-------|--------|
| | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 | Opposing | Box | IMRT 7 |
| 1 | 1254.0 | 1409.0 | 1565.0 | 84.8 | 94.4 | 85.5 | 59.6 | 80.5 | 71.7 |
| 2 | 1489.0 | 1499.0 | 1536.0 | 84.8 | 94.4 | 84.6 | 59.6 | 80.5 | 72.4 |
| 3 | 1795.7 | 1952.5 | 1586.0 | 65.9 | 89.3 | 87.3 | 53.6 | 79.2 | 73.7 |
| 4 | 1819.2 | 2092.9 | 1416.0 | 65.9 | 89.3 | 83.8 | 53.6 | 79.2 | 70.3 |
| 5 | 1890.7 | 2250.8 | 1415.0 | 86.9 | 88.7 | 83.7 | 60.3 | 75.8 | 70.2 |
| 6 | 1736.2 | 1849.6 | 1444.0 | 86.9 | 88.7 | 83.9 | 60.3 | 75.8 | 70.4 |
| 7 | 1697.5 | 1917.9 | 1607.0 | 71.2 | 97.7 | 83.9 | 58.8 | 91.1 | 70.2 |
| 8 | 1254.0 | 1409.0 | 1629.0 | 71.2 | 97.7 | 83.9 | 58.8 | 91.1 | 70.2 |
| 9 | 1489.0 | 1499.0 | 1625.0 | 65.9 | 91.1 | 83.8 | 52.9 | 81.1 | 70.4 |
| 10 | 1795.7 | 1952.5 | 1434.0 | 65.9 | 91.1 | 83.7 | 52.9 | 81.1 | 70.3 |
| 11 | 1819.2 | 2092.9 | 1495.0 | 64.9 | 85.7 | 83.8 | 53.4 | 74.1 | 70.4 |
| 12 | 1890.7 | 2250.8 | 1420.0 | 64.9 | 85.7 | 83.7 | 53.4 | 74.1 | 70.3 |
| 13 | 1736.2 | 1849.6 | 1502.0 | 67.1 | 94.0 | 87.3 | 54.3 | 84.8 | 70.1 |
| 14 | 1697.5 | 1917.9 | 1461.0 | 84.8 | 94.0 | 86.7 | 54.3 | 84.8 | 73.1 |
| 15 | 1254.0 | 1409.0 | 1530.0 | 65.9 | 94.0 | 92.7 | 54.3 | 80.5 | 74.1 |
| 16 | 1489.0 | 1499.0 | 1440.0 | 86.9 | 94.4 | 82.2 | 59.6 | 79.2 | 70.7 |
| 17 | 1795.7 | 1952.5 | 1135.0 | 71.2 | 89.3 | 83.1 | 53.6 | 75.8 | 70.1 |
| 18 | 1819.2 | 2092.9 | 1402.0 | 65.9 | 88.7 | 77.6 | 60.3 | 91.1 | 65.9 |
| 19 | 1890.7 | 2250.8 | 1313.0 | 64.9 | 97.7 | 77.6 | 58.8 | 81.1 | 65.6 |
| 20 | 1736.2 | 1849.6 | 1312.0 | 67.1 | 91.1 | 82.5 | 52.9 | 74.1 | 70.5 |
| 21 | 1697.5 | 1917.9 | 1435.0 | 67.1 | 85.7 | 78.50 | 53.4 | 84.8 | 66.2 |
| Average | 1668.90 | 1853.10 | 1462.00 | 72.37 | 91.56 | 83.80 | 56.12 | 80.94 | 70.32 |
| SD | 211.32 | 287.85 | 117.88 | 8.95 | 3.87 | 3.36 | 3.09 | 5.41 | 2.22 |
| ค่าต่ำสุด | 1254.00 | 1409.00 | 1135.00 | 64.90 | 85.66 | 77.60 | 52.94 | 74.14 | 65.60 |
| ค่าสูงสุด | 1890.70 | 2250.80 | 1629.00 | 86.89 | 97.68 | 92.70 | 60.30 | 91.14 | 74.10 |

ภาคผนวก ค

ข้อมูลการทวนสอบปริมาณรังสีสมบูรณ์แบบจุด

เครื่องมือและอุปกรณ์

- เครื่องเร่งอนุภาคพลังงาน 6 ล้าน โวลต์ (Primus 6 MV)
- หุ่นจำลองสมมูลเนื้อเยื่อรูปทรงลูกบาศก์ (Cubic solid phantom)
- หัววัดรังสีชนิดไอออนในเซชันแชนเบอร์ (CC 01, Scanditronix Wellhofer)
- เครื่องวัดประจุไฟฟ้า (Electrometer, Wellhofer Dose1)

วิธีการ

- คำนวณค่าหน่วยนับวัดรังสีของเครื่อง (Monitor Unit, MU) เมื่อปริมาณรังสี 200 cGy พื้นที่ฉายรังสี (field size) 10x10 ซม² ที่ระยะลึก 9 ซม. มีค่าเท่ากับ 246 MU
- เมื่อได้ค่า MU แล้วนำค่า MU ฉายรังสีตามรูปแบบที่จำลองขึ้นทุกรูปแบบ โดยนำ ionization chamber ใส่เข้าไปภายในหุ่นจำลองสมมูลเนื้อเยื่อ ตำแหน่งแนวกึ่งกลางของลำรังสี ที่ระยะลึก 9 ซม แล้วฉายรังสีทุกรูปแบบที่จำลองขึ้น
- อ่านค่าหน่วยวัดประจุไฟฟ้าจาก electrometer แล้วนำค่าหน่วยวัดไปคำนวณเป็นปริมาณรังสีสมบูรณ์ตามสมการ

$$Absorbed\ Dose = M_Q N_{D,w,Q_0} K_{Q,Q_0} \quad (ก-1)$$

$$= (M k_{pol} k_s k_{T,P}) N_{D,w,Q_0} K_{Q,Q_0}$$

เมื่อ

M คือ ค่าหน่วยวัดที่อ่านได้จากเครื่องวัดประจุไฟฟ้า

k_{pol} คือ Polarity correction มีค่าเท่ากับ 1.0031

k_s คือ Recombination correction มีค่าเท่ากับ 1.00644

$k_{T,P}$ คือ Temperature, Pressure correction ตามสมการ (ก-2)

$$K_{T,P} = \frac{(273.2 + T)P_0}{(273.2 + T_0)P} \quad (\text{ก-2})$$

เมื่อ T_0, P_0 มีค่าเท่ากับ 1013.15 mbar และ 20 องศาเซลเซียส ตามลำดับ
 T, P คือค่าอุณหภูมิและความดันขณะทำการวัดปริมาณรังสี

N_{D,wQ_0} คือ ค่า calibration factor ของหัววัดรังสี สำหรับ CC 01,
 Scanditronix Wellhofer มีค่าเท่ากับ 3.0143×10^9 Gy/C

K_{Q,Q_0} คือ ค่า correction for the radiation quality of beam มีค่า
 เท่ากับ 0.9922

- คัดลอกแผนรังสีรักษาผู้ป่วยโรคมะเร็งปากมดลูกด้วยเทคนิคฉายรังสีแปรความเข้ม7
 ทิศทางลำรังสี แบบ step and shoot ลงบนวัสดุสมมูลเนื้อเยื่อ Easy cube
- คำนวณปริมาณรังสีในวัสดุสมมูลเนื้อเยื่อด้วยพารามิเตอร์เดียวกันกับที่ใช้ในผู้ป่วย
- วัดปริมาณรังสีในวัสดุสมมูลเนื้อเยื่อด้วย MU ที่คำนวณได้ โดยใช้หัววัดรังสีชนิด
 ไอออนไนเซชัน
- เปรียบเทียบการวัดปริมาณรังสีกับปริมาณรังสีที่คำนวณในวัสดุสมมูลเนื้อเยื่อที่
 ตำแหน่งเดียวกันจากโปรแกรมวางแผนรังสีรักษา

ผลการทวนสอบปริมาณรังสี (T =20 °C, P = 969 mbar)

| Plan No. | Temp. | Press. | KTP | Reading E-10 | Measurement dose | Plan dose | %difference |
|-----------|-------|--------|---------|-----------------|---------------------|--------------|-------------|
| 1 | 20.0 | 966.0 | 1.04891 | 5.793 | 184.5 | 190.0 | 2.91 |
| 2 | 20.5 | 966.0 | 1.05070 | 7.146 | 227.9 | 232.0 | 1.75 |
| 3 | 20.5 | 965.0 | 1.05179 | 6.913 | 220.7 | 227.0 | 2.76 |
| 4 | 20.0 | 965.0 | 1.05000 | 4.509 | 143.7 | 145.0 | 0.87 |
| 5 | 20.5 | 967.0 | 1.04962 | 6.142 | 195.7 | 194.0 | -0.89 |
| 6 | 20.5 | 967.0 | 1.04962 | 6.532 | 208.1 | 208.0 | -0.07 |
| 7 | 20.0 | 965.0 | 1.05000 | 6.657 | 212.2 | 215.0 | 1.30 |
| 8 | 20.5 | 966.0 | 1.05070 | 6.117 | 195.1 | 195.0 | -0.06 |
| 9 | 20.5 | 966.0 | 1.05070 | 7.246 | 231.1 | 235.0 | 1.64 |
| 10 | 20.5 | 965.0 | 1.05179 | 6.796 | 217.0 | 225.0 | 3.55 |
| 11 | 20.0 | 965.0 | 1.05000 | 4.483 | 142.9 | 145.0 | 1.44 |
| 12 | 20.5 | 967.0 | 1.04962 | 6.562 | 209.1 | 208.0 | -0.53 |
| 13 | 20.5 | 967.0 | 1.04962 | 6.316 | 201.3 | 203.0 | 0.85 |
| 14 | 20.5 | 965.0 | 1.05179 | 6.584 | 210.2 | 215.0 | 2.21 |
| 15 | 20.0 | 967.0 | 1.04783 | 6.162 | 196.0 | 196.0 | -0.01 |
| 16 | 20.5 | 966.0 | 1.05070 | 6.969 | 222.3 | 229.0 | 2.92 |
| 17 | 20.5 | 965.0 | 1.05179 | 6.673 | 213.1 | 221.0 | 3.58 |
| 18 | 20.0 | 965.0 | 1.05000 | 4.037 | 128.7 | 133.0 | 3.24 |
| 19 | 20.5 | 967.0 | 1.04962 | 6.679 | 212.8 | 209.0 | -1.83 |
| 20 | 20.0 | 967.0 | 1.04783 | 6.369 | 202.6 | 204.0 | 0.68 |
| 21 | 20.5 | 965.0 | 1.05179 | 6.753 | 215.6 | 219.0 | 1.54 |
| RMS | | | | | | | 1.993 |
| SD | | | | | | | 1.53 |
| ค่าต่ำสุด | | | | | | | -1.83 |
| ค่าสูงสุด | | | | | | | 3.58 |

ภาคผนวก ง

ข้อมูลการทวนสอบปริมาณรังสีสัมพัทธ์แบบการกระจายรังสี

เครื่องมือและอุปกรณ์

- เครื่องเร่งอนุภาคพลังงาน 6 ล้านโวลต์ (Primus 6MV)
- หุ่นจำลองสมมูลเนื้อเยื่อรูปทรงลูกบาศก์ (Cubic solid phantom)
- ฟิล์มวัดรังสีชนิดอีดีอาร์ 2 (KODAK รุ่น EDR 2)
- เครื่องสแกนฟิล์ม (Vidar scan)
- โปรแกรมวิเคราะห์รังสีชนิด (OmniPro-ImRT)
- เครื่องล้างฟิล์มอัตโนมัติ (Automatic film processor)
- เครื่องอ่านค่าความดำฟิล์ม (Deluxe Clamshell Densitometer)

วิธีการ

- คัดลอกแผนรังสีรักษาผู้ป่วยโรคมะเร็งปากมดลูกด้วยเทคนิคฉายรังสีแปรความเข้ม 7 ทิศทางลำรังสี แบบ step and shoot ลงบนวัสดุสมมูลเนื้อเยื่อ Easy cube
- กำหนดปริมาณรังสีในวัสดุสมมูลเนื้อเยื่อด้วยพารามิเตอร์เดียวกันกับที่ใช้ในผู้ป่วย
- วัดการกระจายปริมาณรังสีสัมพัทธ์ในวัสดุสมมูลเนื้อเยื่อด้วยฟิล์มวัดรังสี โดยใช้ MU ที่คำนวณได้ จากเครื่องเร่งอนุภาคพลังงาน 6 ล้าน โวลต์
- Film processor จากเครื่องล้างฟิล์มอัตโนมัติ
- สแกนฟิล์ม และวิเคราะห์รังสีชนิด โดย โปรแกรมวิเคราะห์รังสีชนิด
- เปรียบเทียบการกระจายปริมาณรังสีสัมพัทธ์ที่คำนวณในวัสดุสมมูลเนื้อเยื่อ กับ โปรแกรมวางแผนรังสีรักษา ด้วยค่าดัชนีแกมมา

ผลการทดสอบปริมาณรังสี

| Plan No. | Total volume (pixels) | Volume of Gamma index (pixels) | | Gamma index <1 |
|-----------|--------------------------|--------------------------------|------------------------|----------------|
| | | Gamma index <1 | Gamma index ≤1 (1-1.5) | Volume (%) |
| Plan 1 | 277693 | 264149 | 13544 | 95.12 |
| Plan 2 | 240534 | 229625 | 10909 | 95.46 |
| Plan 3 | 238095 | 207282 | 30813 | 87.06 |
| Plan 4 | 248976 | 219395 | 29581 | 88.12 |
| Plan 5 | 235221 | 229810 | 5411 | 97.70 |
| Plan 6 | 190960 | 181253 | 9707 | 94.92 |
| Plan 7 | 243530 | 224399 | 19131 | 92.14 |
| Plan 8 | 258570 | 224520 | 34050 | 86.83 |
| Plan 9 | 218088 | 197238 | 20850 | 90.44 |
| Plan 10 | 253991 | 229575 | 24416 | 90.39 |
| Plan 11 | 262650 | 233069 | 29581 | 88.74 |
| Plan 12 | 250985 | 229080 | 21905 | 91.27 |
| Plan 13 | 249494 | 227601 | 21893 | 91.23 |
| Plan 14 | 233698 | 206954 | 26744 | 88.56 |
| Plan 15 | 246510 | 219613 | 26897 | 89.09 |
| Plan 16 | 240060 | 228493 | 11567 | 95.18 |
| Plan 17 | 250500 | 235730 | 14770 | 94.10 |
| Plan 18 | 245009 | 235712 | 9297 | 96.21 |
| Plan 19 | 245490 | 245337 | 153 | 99.94 |
| Plan 20 | 248976 | 217395 | 31581 | 87.32 |
| Plan 21 | 190960 | 181253 | 9707 | 94.92 |
| Average | 241428.10 | 222261.10 | 19167.00 | 92.13 |
| SD | 20469.81 | 19418.47 | 9733.16 | 3.82 |
| ค่าต่ำสุด | 190960 | 181253 | 153 | 86.83 |
| ค่าสูงสุด | 277693 | 264149 | 34050 | 99.94 |

ภาคผนวก จ

ผลงานวิชาการ

1. เสนอผลงานวิชาการ วันมหิดล คณะแพทยศาสตร์ ม.เชียงใหม่ ประจำปี 2551 หัวข้อ
“Dosimetry Comparison of Intensity Modulated Radiation Therapy and Conventional Radiation
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DOSIMETRY COMPARISON OF INTENSITY MODULATED RADIATION THERAPY AND CONVENTIONAL RADIATION THERAPY FOR STAGES II & III CERVICAL CANCER PATIENTS

Pichet Uber, Vicharn Lorvidhaya, Pimkhuan Kamnerdsupaphon, Somsak Wanwilairat

Division of Therapeutic Radiology and Oncology, Department of Radiology, Faculty of Medicine, Chiang Mai University, Chiang Mai 50200, Thailand

Background Cervical cancer represents the disease that is most commonly treated with radiation therapy. Intensity modulated radiation therapy (IMRT) is a new technology that provides a better control of radiation dose and distribution during radiation therapy. In the implementation of IMRT, many factors are taken into the considerations during the planning; the distribution and the accuracy of the absorbed doses are the main issues. When it is well set up and planned, the implementation of IMRT should improve the quality of radiation therapy for cervical cancer patients.

Purpose To compare the radiation dose distribution in the target tumor and the critical neighboring organs between IMRT and the conventional techniques in the treatment of stages II & III cervical cancer patients.

Methods and materials Computed tomography scan of 21 patients with cervical cancer stages II & III were retrieved and used in the external beam radiation therapy treatment planning. The delineation of clinical target volume (CTV), planning target volume (PTV), uterus, pelvic node, bladder, rectum, small bowel, femoral head and bone marrow were performed on a three-dimensional planning system (Pinnacle3, Philips). Also, the images with contouring data were exported to an IMRT planning system (KonRad, Siemens). Subsequent treatment plans were done on these two planning systems using 6 MV photon and uniform prescription, 45 Gy in 25 fractions. Seven beams IMRT plans were used to obtain a full coverage of the PTV with the 95% isodose curve (D95). Dose volume histograms, conformity index (CI) and mean dose were evaluated for all the plans. Following the planning, testing was performed with the use of a water equivalent phantom to receive the planned radiation. The ionization chamber and Kodak EDR-2 films were used in the verification of point dose and 2D dose distributions, respectively, in the irradiated phantom. The measured point dose and relative dose distributions were then compared with the calculated doses. A Student's t test was performed to compute the statistical significance.

Results In the first stage, comparisons were made between the IMRT and the two conventional techniques. With using the IMRT technique, the D95 of CTV, PTV, uterus and pelvic lymph node were 49.0 Gy, 45.3 Gy, 46.5 Gy and 45.1 Gy, respectively; these doses were all higher than the corresponding doses delivered by the conventional techniques. For the comparison, the D95 of CTV, PTV, uterus and pelvic lymph node were 45.5 Gy, 45.3 Gy, 45.2 Gy and 44.5 Gy, respectively, when the conventional two-opposing technique were used, and 44.5 Gy, 44.3 Gy, 45.0 Gy and 44.1 Gy, respectively, when the conventional four-field technique were used. When the CI was compared, the IMRT resulted in a much better conformity (3.84) than the four-field (12.95) and two-opposing techniques (21.62). The mean doses of bladder, rectum and small bowel in the IMRT plan were 38.8 Gy, 34.0 Gy and 21.9 Gy, respectively, which were all significantly higher than the corresponding doses in the two-opposing fields technique (46.5 Gy, 46.4 Gy and 32.6 Gy, respectively), and the four-field technique (45.8 Gy, 44.5 Gy and 35.0 Gy, respectively). In the second stage of the study, the verification of absorbed dose and dose distributions revealed that the mean deviation (RMS) and the γ -index were 1.993 and less than 1, respectively, indicating that there was a good agreement for all the plans.

Conclusion In this group of stages II and III cervical cancer patients, IMRT was superior to conventional technique in providing radiation beam for the treatment. IMRT provides excellent coverage and higher radiation doses to the tumor while reducing radiation to the normal tissue and critical neighboring structures. The comparison of measurement absorbed dose and dose distributions to calculation dose showed that all of the treatment planning system calculations provided acceptable accuracy.

รูป จ-1 บทคัดย่อผลงานวิชาการในงาน วันมหิดล คณะแพทยศาสตร์ ม.เชียงใหม่

ประจำปี 2551

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| ชื่อ | นางพิเชษฐ์ อุเบอร์ |
| วัน เดือน ปีเกิด | 9 มีนาคม พ.ศ. 2520 |
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