

Why does pelvic radiation disease happen?

Wilhelm Roentgen discovered the X-ray in November 1895 and gave the first public lecture about “a new kind of ray” in January 1896. Within a few months, the potential of X rays was recognized widely. The first patient to be treated with “radiotherapy” was Rose Lee in Chicago in 1896. She had relapsed breast cancer for which no further treatment was available and Emil Grubbe, a medical student (!) persuaded his professor to allow him to try this new treatment for her. She had an excellent response!

X ray technology spread very quickly. Early radiotherapy consisted of a single large dose of radiation. Severe side effects were frequent, and were quickly recognized. However, by 1914, a possible solution to these severe side effects was proposed. It was suggested that delivering radiotherapy over many days in small doses (a technique now called “fractionated radiotherapy”) would be better and by the early 1920s, this had been proven to be correct.

Changes in technology had enormous impact. Early primitive machines using radium were superseded by more reliable machines using cobalt and caesium followed eventually by the development of the linear accelerator which is an electrical device for accelerating subatomic particles and which does not need a physical radiation source. The generation of higher energy radiation beams allowed for more effective cancer treatment and more recently the addition of lead “shutters” and other devices have improved the precision with which the radiation beam is delivered. Precision has become the watchword of the 21st century with techniques such as CT, MRI and PET scans allowing increasingly accurate radiotherapy.

Yet, tumours are surrounded by normal healthy tissues. To be certain of killing a tumour, the radiotherapy has to include some of the surrounding healthy tissue. Radiotherapists plan how they will deliver the radiotherapy to each individual very carefully to minimize as far as possible damage to normal tissues but it is an inevitable consequence of radiotherapy that some healthy tissues will be exposed to potentially damaging radiation. Sometimes this causes few problems, at other times it causes damage to critical structures.

Our understanding of how damage to healthy tissue develops has grown. Radiation-induced injury is like a complex wound which will not heal properly. A small number of pioneers around the world have worked to improve our understanding of how this “complex wound” develops and what steps are effective to try to get it to heal. There is real progress. “Pelvic radiation disease” has been defined as “transient or longer term problems, ranging from mild to very severe, arising in non-cancerous tissues resulting from radiotherapy treatment to a tumour of pelvic origin.”

In 2006 the Royal Marsden Hospital appointed Dr Jervoise Andreyev to a new post, Consultant Gastroenterologist in Pelvic Radiation Disease, the first such specialist post to try and improve the outcomes of patients suffering the side effects of radiotherapy in the world.

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