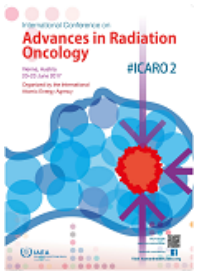

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Challenges and solutions, advantages and disadvantages of launching 1st 3-Dimensional brachytherapy in a developing war-torn country (Iraq) using Co-60 High Dose Rate (HDR) source

Tuesday, June 20, 2017 10:30 AM (5 minutes)

Background:
Brachytherapy (BT) is a well-known part of radiotherapy services for cancer treatment globally for almost a century and can be generally of low dose rate (LDR) or high dose rate (HDR) via using different radioactive isotopes. This service was used to be in Iraqi radiotherapy institutes till 1990s when the wars and embargo started to affect all the aspects of life. All the patients who were in need for this modality of treatment had to travel abroad, incurring great cost as they did so. Recently, this service became available again free of charge inside Iraq. In this paper, we will describe the challenges and solutions, advantages and disadvantages of launching the 1st 3-Dimensional BT in a developing war-torn country using Co-60 HDR source.

Methods:
Zhianawa Cancer Center (ZCC), a public radiotherapy facility established in 2009 in Sulaymaniyah city – Kurdistan –Iraq, wanted to add BT to the list of treatment modalities offered. We had to choose between delivering BT through LDR or HDR in addition to choosing the type of source. All while trying to overcome multi-layers of challenges.

Results:
1. The choice of the HDR after-loader over LDR was made for two reasons: HDR delivers similar clinical outcome as LDR but without the hassle of hospitalizing the patient. An important challenge to keep in mind as our facility is a stand-alone RT clinic and lacks the required in-patient care for the LDR implants.
2. Once the choice of after-loader was made, we had to look at the type of source to buy. The popular iridium, Ir-192, vs the more recent Cobalt, Co-60, source. Co-60 has a half-life that is about 26 times that of Ir-192, 5.26years vs 74 days. This means that we have to worry about the difficulties and the red-tape of exporting a radioactive material once every few years. The bureaucratic delays and multi-layers red tapes that are abundant the public health system in Iraq, makes purchasing equipment very difficult. Other advantages of using a long-lived source is less transport difficulties and less need for performing source exchanges and hence acceptance testing.
3. The center does not have a Well-chamber to measure the source activity when it arrives, so we requested that the appropriate set of quality assurance tools be delivered with the machine. We were surprised to receive the Krieger Phantom. The vendor delivered the Co-60 after-loader and its control and planning systems, along with that we received an electrometer, a 0.6cc ion chamber and the Krieger Phantom. As this phantom is not very popular outside Germany, we had to contact many experts and search many protocols (some in German) to know how to use the phantom for source measurement. This alone, took a good part of 2 years.
4. Two decades of war and embargo had led to a severe lack of local expertise in brachytherapy physics and clinical services. To overcome this situation, we setup multiple in-house workshops and training courses, experts from the region and internationally provided hands-on training for our staff. To gain enough knowledge and to be confident, this part also took some 2 years. A regional expert was present during the treatment of the first HDR patient.

The machine was available on site in 2013, however, the first patient was treated in mid-2016, and since we have treated 10 patients for gynecological tumors, each for 2-5 sessions.

Conclusions:
In spite of the difficult challenges, BT was successfully re-started in Iraq. As of now, our center in Kurdistan is the only one delivering such service to the entire population of Iraq free of charge. In this synopsis, challenges and solutions, advantages and disadvantages of using the Co-60 HDR BT were explored. The authors believe that this piece of knowledge might be of interest to the colleagues in the international communities who are facing similar challenges.

Institution

Radiation Oncology Program, Zhianawa Cancer Center –Kurdistan Board for Medical Specialties, Sulaymaniyah –Iraq

Country

Iraq

Primary author: GHAFOUR, Hawbir O. (Zhianawa Cancer Center)

Co-authors: WAHBI, Araz (Zhianawa Cancer Center); JARADAT, Imad (King Hussein Cancer Center); MULA-HUSSAIN, Layth Yahya (Zhianawa Cancer Center - Kurdistan Board for Medical Specialties); OTHMAN, Nyan (Zhianawa Cancer Center); WADI-RAMAHI, Shada (King Faisal Specialist Hospital and Research Center)

Presenter: GHAFOUR, Hawbir O. (Zhianawa Cancer Center)

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