Purpose: Brachytherapy plays an important role in radiation therapy a wide range of tumor sites such as vaginal, cervical and endometrial cancers. The purpose of this project was to design, fabricate and verify a new phantom for dosimetric verification at small distances from GYN applicators used with GZP6 cobalt-60 HDR system.

Methods: A new phantom has been designed and fabricated from 90 slabs of 18x16x0.2 cm3 Perspex to accommodate one tandem and two ovoids. The thin layer of the slabs was chosen to place GafChromic films in between the slabs for dosimetry with GZP6 cobalt-60 HDR system. For verification of this device, an assembly composed of a large ovoid size (3cm diameter) and tandem #1 with the least curvature was selected in this study. With this assembly, GafChromic films were exposed using a plan with 500 cGy dose delivery to point "A". The irradiated films were scanned. The responses of the films were converted to dose by calibrating samples of these films using a cobalt-60 teletherapy system in the range of 25 to 800 cGy dose. The measured isodose curves with the films were compared to calculated isodose lines by the treatment planning software.

Results: The result of these investigations indicated differences of up to ± 23% between the planning and measured dosimetry at different points in GYN implant with cobalt-60 HDR source of GZP6 system. Therefore, this phantom enabled us to confirm the accuracy of radiation delivery to the GYN patients with cobalt-60 HDR source of GZP6 system.

Conclusions: The new phantom design could be utilized for the QA procedure of the GZP6 cobalt-60 HDR system as well as the Ir-192 HDR system to confirmation the accuracy of dose distribution in GYN implants, especially in non-traditional implants.

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