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Cervical cancer and unspoken disparity among women: Search for inexpensive therapeutics

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Commentary

Cervical cancer ranked fourteenth among all cancers and fourth-ranked cancer among women worldwide. Every year almost 50 million cervical cancer cases have been reported worldwide. The northeast part of India has highest cases of cervical cancer patients following stomach cancer. It is the fifth leading cause of death in many parts of the world. The broken health care system in the state of Arunachal Pradesh is self-explainable with the current scenario of absence of any tertiary cancer care system in any health care provider in the state. Although, the screening of cervical cancer is an absolute requirement for female on the arrival of their puberty, the socioeconomic status of the community and individuals play important role (1-3). The reproductive health regarding monogamous sexual partner is one of the most important considerations in preventing cervical cancer. The factors which are most often unconscious and ignored by people of any area are socioeconomic barriers, education and basic hygiene. The educational and scientific awareness of the society through public-private-government partnership might help prevent most of the 'cervical cancer cases. The main causative agent of cervical cancer is human papillomavirus (HPV). The discovery that demonstrated the presence of HPV genome in cervical cancer was awarded as Nobel Prize to Prof Herald zur Hausen in 2008. As per international committee on the taxonomy of viruses (ICTV) one hundred eighteen papillomavirus (PV) types have been described and 15 out of which are known to be pathogenic to human (4-6). The screening of females for cervical cancer diagnosis could be performed by two available diagnostic tests, a) HPV test, and b) Pep test. The HPV test look for the presence of any HPV virus in cervix region, However, the Pep test recognized the cell changes associated with the cancerous transformation. However benign and initial stages of cancer could be treated with various treatment plans and options which include radiation therapy, chemotherapy, targeted therapy, immunotherapy and surgeries (7). When screened early the benign stage of cervical cancer is curable. In case of benign tumor, the preliminary information like type of cancer, stage of cancer, goals of treatment, side effects and expected length of treatment are necessary considerations. The advanced stage where recurrent lesions, wrap and metastatic growth is exponential, the treatment plans and primary considerations could change based on the stage of cervical cancer. It has been reported extensively so far through various research and developmental studies regarding the role of one of such growth factors known as vascular endothelial growth factor (VEGF) in advanced recurrent metastatic cervical cancer (8). The HPV is known to interfere with the regulation of p^{53} protein of cell cycle pathway in metastatic stage of cervical cancer. It also interacts and influence the signaling pathways of epidermal growth factor receptor, essential for cell division and multiplication. The HPV is known to interfere with the regulation of p^{53} protein of cell cycle pathway (9-10). However, simultaneously virus interacts and modulates the epidermal growth factor signaling pathway. The epidermal growth factor and receptor are required for the cell division, multiplication and angiogenesis in host. Although up-regulation of endothelial growth factor (VEGF) is closely associated with invasiveness and metastatic stage of cancer, the clinical significance in predictive diagnosis is insignificant due to variation in species and genome of human papillomavirus (HPV). The inconsistency of microvascular density based predictive diagnosis of cervical cancer indicates the E6 oncoprotein mediated irregularities of vascular endothelial cell migration and proliferation. This might lead to genetic and epigenetic alterations in host cell genes. The mutations in VEGF gene and receptor have also found to involved in tumorigenesis and malignancy in cervical cancer. This is partly due to species specific pathogenicity imparted by human papillomavirus (HPV). Despite FDA approval of highly expensive bevacizumab antibody based anti-VEGF therapy for intractable cervical and other gynecological cancers, a patient may require other modes of advance treatment like cytotoxic T-lymphocyte-associated protein-4 (CTLA-4) and programmed death ligand-1 (PD-L1) inhibition (11). Hence, there is a growing need to develop inexpensive selective targeted therapeutics against intractable cervical cancer. Since cervical cancer is the 4^{th} leading cancer in women worldwide. Therefore, it is a

pressing economic disparity in suburban women across the world specially in developing countries. Hence, developing inexpensive small molecule-based therapeutics with minimal adverse effects could be an essential goal to achieve for society and world at large. The research and innovation on the already existing natural resources could be a gate to screen and isolate specific chemical molecule. The molecule, if has high selectivity against VEGF receptor and least toxic, could be formulated in various dosage form.

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Authors' contributions

I, Sanjay Rawat declares that the studies on cervical cancer related to target identification and further progress have motivated me to write the commentary.

Competing interests

The author declares no competing interest.

Data Availability Statement

No datasets were generated for this commentary. However, materials that support finding of this study are available from the corresponding author upon reasonable request.

Ethics approval and consent to participate.

Approval to write and explain the burden of cervical cancer in female in the form of a commentary is to create an awareness. The study and the insight about the burden and suffering associate with cervical cancer was done under the guidance of both Research and Ethics committee of Apex Professional University, Pasighat, Arunachal Pradesh, India and as per the guidelines of University Grant Commission (UGC), Government of India, New Delhi, India.

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