Facts of floater artifacts: A riddle

Sir,

Artifacts are a part of routine pathology practice. And indeed artifacts can be encountered from the time the tissue is taken for examination by microscopy to the final stage, i.e., when the slides are mounted for reporting. Artifacts are of many types. The crush artifact, sectioning artifact, and floater artifact are a few among a long list of artifacts.[1]

Floaters are types of artifacts which are seen while examining the tissue sections for final diagnosis. These are tissues which are essentially not a part of the tissue being examined. In other words, these are extraneous. Arising out of cross-contamination, these are a potential source of diagnostic error. When the extraneous tissue is malignant, there is a chance of misdiagnosis of cancer even where the original pathology is actually benign.[2]

In a study published by Layfield et al. in the American Journal of Clinical Pathology, floaters were found to occur in 0.01–1.2% of slides.[2] Floaters can be both fascinating and frightening. Particularly in small tissue biopsies they pose a problem. Any unrelated tissue would usually be detected by an alert pathologist. But if the floaters are derived from the same organ as that originally biopsied, then even for astute pathologists, identification becomes difficult. In these cases, eventually molecular methods of diagnosis may help in solving the riddle.

The cross-contamination of extraneous tissue can occur at the time of grossing of specimens or at the time of processing. Therefore, it is essential to give attention to each specimen individually and maintain clean grossing board, instruments, etc. Some simple measures like maintaining a gross register with diagrams of the tissue sections while grossing can help one to go back and check again to detect the error if any. Also not giving sequential numbers to specimens from the same organ at the time of receipt of the specimen itself, may help to minimize error. During the processing of the tissue also, there is a chance of contamination. In their study, Layfield et al. have described water bath contamination, as the most common source of origin of floaters.[2]

To identify floaters, Layfield et al. have suggested that mismatch of part of the tissue with the main specimen tissue type and the presence of this discordant tissue in a single level are the clues which point toward the extraneous nature of the floater.[2]

So pathologists should be alert and aware about potential contamination of especially small tissues by floater artifacts. They should rule out any such possibility and check all available information (clinical and imageological) before rendering any unusual diagnosis. The riddle of floaters can be solved by an alert team of pathologists and laboratory technicians.

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Sir,

In 2006, in one million Indian population, there were about 860 incident and 2600 prevalent cancer cases. By 2016, this number is expected to have increased to 1060 and 3200, respectively. [1]

In India, over 70% of cancer patients report for diagnostic and treatment services in advanced stages of their illness, where radiotherapy (RT) stands as one of the main modalities of the treatment. Unfortunately, India has a very low density of RT services, approximately 0.3 megavoltage high energy machine per 100,000 population as compared to the Western standards of one or more machine per million. [2]

Moreover, recent trends show an increase in the RT cost over the last decade, due to new facilities being established in the private sector with interlinked quality assurance and technological evolution. [3]

Overall, 57.5% of global head and neck cancers occur in Asia, especially in India, for both sexes. [4] Nearly 800,000 new oral cancers are diagnosed every year in India.

Madhya Pradesh (MP) is the second largest state of the country in terms of area with a population of around 72 million. [5] Tobacco consumption is widely prevalent in the state, and the incidence of tobacco-related cancers is the world's highest along with the Northeast and Southern Indian districts.

Bhopal is the capital city of the state and is famous for the fateful gas tragedy of 1984. Bhopal has the world's highest age-standardized incidence of both tongue (10.9) and mouth cancers (9.6) in males. [4]

There is a wide gap in the availability and access of RT facilities in most parts of India, mainly in the public funded hospitals. Moreover, RT machine burden in a public cancer hospital in India increases the waiting time, and 25% of advised patients do not comply with the prescribed treatment. Infrastructure, machine, and manpower constraints lead to more patients being treated on cobalt (74%) and by two-dimensional (78%) techniques. [6]

Government Funded Public Institutions need to evaluate the standards of RT service. The number of cancer cases is estimated to be increased to 1,220,000 by 2016 while the existing treatment facilities for cancer control in terms of RT facilities is inadequate to take care of even the present load. [1] In 2011, telecobalt to linear accelerator (LA) ratio in India was 277/157 (1.8:1) [7] and has shown no significant change until date. According to the 2011 census, the population of MP is 72,597,565, and the number of incident cancer cases in the state is around 76,320. [1,5] In accordance with the international (World Health Organization and International Atomic Energy Association) standards of 500 patients per machine, [1] the total requirement of RT machines in the state would be around 150 by 2016, and a shortfall of 93 RT units in the state of MP is estimated. [1] This situation would also create a shortage of skilled RT professionals required to operate the required number of RT machines.

The existing RT facilities in Bhopal entail three centers, one in the Government Medical College (Cobalt 60 teletherapy) and two in the private centers (LA). It is worth mentioning that the government setup provides its services free of charge.

Addressing the status of radiotherapy facilities in Bhopal: World leader in mouth cancers.