



Artifacts: A Challenge in Histopathological Diagnosis

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Description

A definitive diagnosis cannot be made using microscopic examination when there are artifacts, which are image errors that can happen at any stage of tissue processing, from the stage of tissue collection to the stage of staining. These artefacts can be distinguished from normal or pathological tissue, which enables a more precise definition and, in turn, a more effective treatment plan. With this study, we hope to highlight some of the artefacts that may appear during histopathological examinations that are used to make a final medical diagnosis.

Histopathology, the study of analysis for diagnosis and research, offers a conclusive diagnosis through microscopic exams and remarks. The right choice of the biopsy protocol, fixation, sectioning, and staining stages are crucial for arriving at a conclusive diagnosis. A mistake in the analysis could result from negativity, negligence, or the presence of a foreign substance in any of these steps. These mistakes, sometimes found in these tests where even the tiniest detail counts, are referred to as "artefacts" [1]. The change in structure or tissue brought on by a foreign factor in a microscopic section is referred to as an artefact in histopathological examinations [2]. Artifacts can be caused by a number of things, including issues with fixation fluids, inadequately fixed tissues, tissues stored in extreme heat or cold, mistakes made during surgical intervention, chemical exposure, locally applied anesthetics, and improper staining protocol [1]. While some artefacts are simple to distinguish, others are more challenging to do so, which could result in incorrect diagnoses [3,4].

Types of artifacts

Prefixation artefacts: These are the kinds of artefacts that appear before the fixation stage. These artefacts

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may develop as a result of blade damage, surgical procedure compression, or surgical procedure contamination.

Injection artefacts: These artefacts are a result of intraregional aesthetic solution injections, which can separate connective tissue bands and result in bleeding and vacuolization. Local anaesthetics should only be used if the area is large enough for the lesion; direct application of aesthetic to the lesion should be avoided.

Squeeze artifacts: These include crushing, bleeding, and fragmentation because of the pressure surgical instruments put on the tissue. Even mildly injured tissues nevertheless suffer damage.

Fulguration artifacts: Artifacts known as fulguration artefacts are produced when connective and epithelial tissue undergo changes as a result of high temperatures.

Tattoo pigment artefacts: Due to some chemicals in tattoos, which are becoming more and more common in our day, they leave a colourless remnant on the skin pigments.

Sutural artefacts and starch: Powder is added to surgical gloves to make them more pleasant to wear while protecting them from contamination during surgery. But this powder, which is a contamination for the samples, is seen as blue, tiny, spherical particles, especially in hematoxylin-eosin staining.

Prefixation of the tissue incorrectly: Fixation of the tissue is provided by passing through numerous series of solutions.

Artifacts of fixation: The correct tissue diffusion and interlayer separation must be prevented in order to acquire a healthy microscopic image from the tissues. Fixation can be thought of as the initial stage of the cytolog-

ical and histological analysis. Fixation is a process that makes it possible to study living tissue as closely to its natural state as possible [5].

Artifacts of microwave fixation: Microwave fixation is offered in some histopathological staining protocols. Recent years have seen the acceptance of microwave in histopathological protocols, which have been used in a variety of stages including stabilising tissues, frozen techniques, fixation, staining, histoprocessing, and immunotechniques [6].

The correct diagnosis and the correct treatment principle may not be applied as a result of some artefacts encountered, despite the fact that histopathological diagnoses made for various purposes, such as procedures to shed light on scientific studies in experimental animals and to confirm the diagnosis in biopsy, allow us to apply more appropriate treatment protocols for service to humanity. In addition to identifying artefacts and ensuring that they are minimised by the actions taken, it is crucial to determine what kind of diagnostic protocol to use when artefacts are present.

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