

Accidental Cross Contamination Of Traumatic Tracheostomy Tissue Histology With Extraneous Squamous Cell Carcinoma: A Case Report

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Abstract

Contamination of extraneous neoplastic tissue in tissue histology is unusual, but it may lead to a potentially detrimental to the care of the patient. We present a case of accidental cross contamination of squamous cell carcinoma in a histology slide of a patient who had tracheal stenosis repair following a road traffic neck trauma. On reviewing the literature, we couldn't find a contamination of neoplastic tissue in a normal tracheal tissue up to our knowledge; this is the first reported case in this category. We discussed the considerable confusion and potential surgical risks of such tissue contamination and reviewed the relevant literature.

INTRODUCTION

Extraneous tissue contaminants in surgical pathology are rare but potentially devastating mishaps. The incidence of extraneous tissue was 0.6% in the prospective national study of a large American series checking over thirty thousands pathology slides, although the degree of diagnostic difficulty caused by extraneous tissue is judged to be severe in 0.4% of slides. Extra care and methodical handling of cancer tissue could avoid confusion. Assessment of the frequency, type, origin, source, and diagnostic difficulty of extraneous tissue provide benchmarks of extraneous tissue handling in surgical pathology.

CASE REPORT

A 37 year old male was admitted to ENT department after a traumatic tracheostomy following road traffic accident. His larynx was severely crushed. An urgent tracheostomy was performed following a period of resuscitation. He made a good recovery afterwards. This was however, complicated by granulation tissue formation causing subglottic stenosis and problems with application of tracheostomy tube. We decided to trim the tracheostomy stoma and biopsy the granulation tissue. Sections of the subglottic biopsies showed several fragments of granulation tissue. Within the tissue block there is a separate tissue fragment with an appearance totally different from the rest of the fragments (figure1). This fragment consists of markedly atypical cells,

suggestive of an epithelial neoplasm (figure2).

Figure 1

Figure 1: Long arrow pointing the tracheal tissue, Short arrow pointing the extraneous tissue

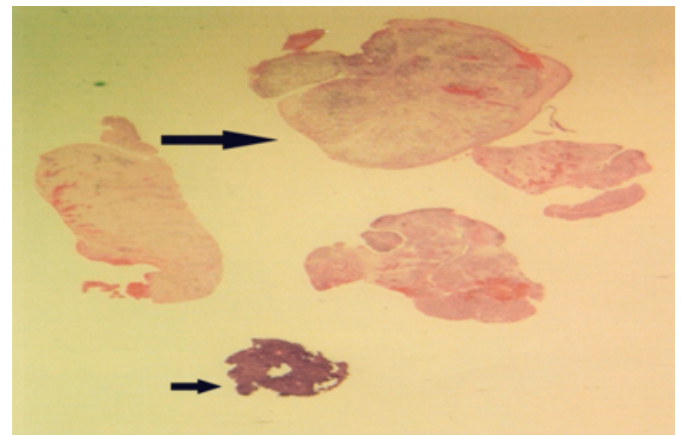
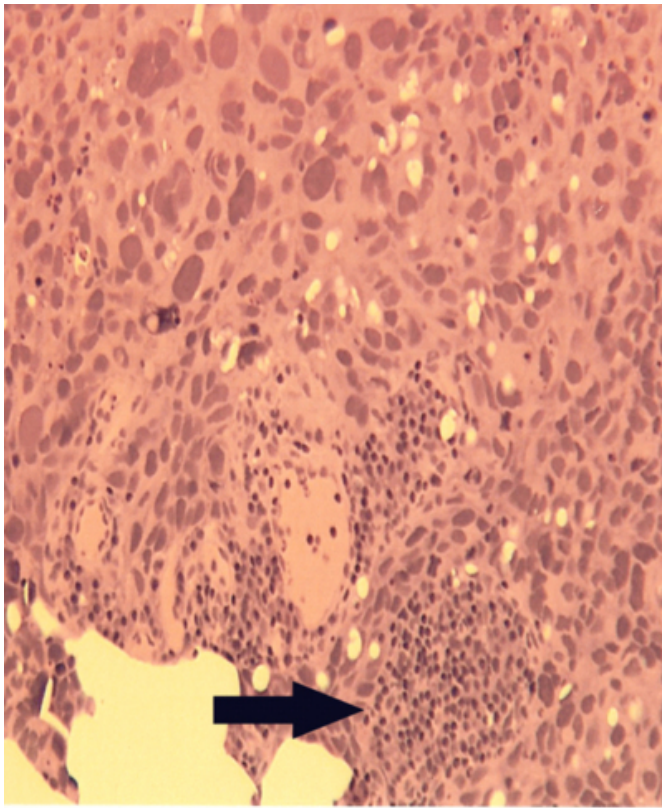


Figure 2

Figure 2: High power view of cancer cells in extraneous tissue



The fragment is, however, very poorly preserved and shows air-drying artefact. It is felt that this fragment represents cross contamination of tissue as the appearance is totally out of keeping with the clinical history of this patient. In addition the poor preservation and air-drying artefact suggest that this fragment was placed in formalin with the rest of the fragments of the granulation tissue. There is no suggestion of a malignant process in any other fragments of granulation tissue. The source of the cross contamination has not been identified immediately within the laboratory. However, after DNA examination, the squamous tissue was found to be unrelated to the patient and is considered a contamination from tissue from other patients in the pathology lab. Clinical evaluation including endoscopy of this patient is repeated, but further assessment shows no evidence of malignancy and the patient was asymptomatic over the next two months. Further biopsies were not performed.

DISCUSSION

The impact of accidental cross contamination of extraneous tissue on the surgeon, patient and the pathologist are huge. When 57083 pathology slides were reviewed in a

retrospective study by the College of American Pathologists, 2.9% of slides were found to have a contaminant. We need to determine location of extraneous tissue on slides. As in our case there is a separate fragment with an appearance totally different from the rest of the fragments of the original tissue.

The type of extraneous tissue could be normal, abnormal, non-neoplastic, neoplasm, microorganisms, or in fact any other possibility. However, if normal or inert tissue is found the confusion and unrest is negligible, and accordingly no further confirmation or exclusion steps are necessary. This case showed a cancerous tissue of markedly atypical cells, suggestive of a squamous neoplasm, pending further investigations as to the potential source of the extraneous tissue, to prove that the squamous tissue is unrelated to the patient. Also clinical assessment of this patient is needed to exclude the possibility of real concealed or occult malignancy. This has showed no evidence of malignancy and the patient was asymptomatic over few months period.

To reduce the misdiagnosis and excess contamination in cancer cytology and histopathology, various methods to eliminate the disadvantages of conventional techniques have developed. These include single Focal gradient and cytocentrifuge², laser-assisted microdissection technique³, automated system^{4, 5}, single-cell polymerase chain reaction and autoradiographic coating technique⁶.

The class of extraneous tissue, whether a slide or block contaminant may help in delineating the scale of contamination. This requires checking all other slides at the time of the contamination. No other contamination was found in our report after a period of appropriate evaluation of all tissue blocks and slides reviewed during the timescale of the contamination. In the American experience It is estimated that over half of the extraneous tissue is classified as slide contaminants, and nearly another quarter is within the paraffin block. Of those slides with extraneous tissue, the extraneous tissue was located near diagnostic tissue sections in 59.5% of the slides reviewed prospectively and in 25.3% of slides reviewed retrospectively. Deeper sections were performed to evaluate extraneous tissue in 12.2% of prospective cases and in 3.1% of retrospective cases.

The source of extraneous tissue could not be found in our case. This can be potentially from the lab itself, from the theatre or even from personnel transferring the sample between theatre and the lab. Investigation must be thorough,

methodical and extensive, in order to avoid these detrimental effects both to the patient involved and indeed other patients whose tissues had been handled in the same way and during the same period. The origin of extraneous tissue could be the pathology laboratory (90% of cases), physician's office or operating room. It could not be determined whether tissue in the diagnostic sections was extraneous in 0.1% in the American experience⁷.

The degree of diagnostic difficulty caused by extraneous tissue does not need to be overemphasised. This is the source of concern of the surgeon, should evidence of neoplasia be potentially present, or can not be excluded. Further management is accordingly necessary including clinical assessment, further biopsies and further appropriate scans.

Guidelines might be crucial in the attempt towards the prevention of cross contamination. Of the American laboratories, 98% had written guidelines for changing solution in tissue processors, and 64.9% had guidelines for maintaining water baths free of extraneous tissue. The vast majority of laboratories use lens paper filters bags, or sponges for processing fragmented and small specimens.

Documentation of any mishap like that is necessary to relieve the confusion to the surgeon, pathologist and patient alike. Written protocols for documentation of extraneous tissue in surgical pathology reports were established in 6.1% of American laboratories, for removal of extraneous tissue from blocks in 5.7%, and for removal of extraneous tissue from microscopic slides in 4.7%. In 24% of laboratories no comment or record was kept to document extraneous tissue.

CONCLUSION

Contamination of pathology samples must be investigated thoroughly. Policies need to be reviewed after each case of contamination to find out the missing measures in handling of cancer tissues. Periodical review, high level of suspicion and close liaison between surgeons and pathologists may prove vital in order to deliver a safe reliable service.

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