

## “Single file” pattern in histopathology

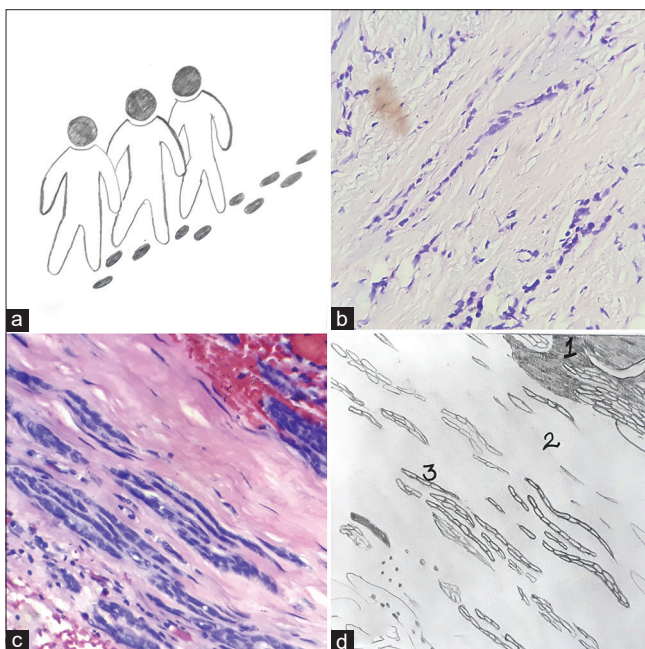
“Single file” arrangement of the tumor cells is a feature of various malignancies, and the cells are seen arranged in linear rows which appear as if one following the footsteps of another.<sup>[1]</sup> The term has been used interchangeably with “Indian file” probably denoting Amerindians people’s way of walking along a trail as illustrated in Figure 1a. The pattern may be appreciated both cytologically and histologically. Sometimes, this pattern is also referred to as “cord-like” pattern as characterized by the presence of single line of tumor cells; this is considered to be highly characteristic of lobular carcinoma of the breast [Figure 1b].

Although, lobular carcinoma is a distinctive feature of breast; in head-and-neck region, this pattern has also been described commonly in polymorphous adenocarcinoma, and malignant epithelial tumor characterized by cytological uniformity, morphological diversity and an infiltrative growth pattern.<sup>[2]</sup> On case-by-case basis, the term “low grade” may be added. Morphological diversity is seen as the tumor cells grow in solid pattern, cribriform pattern,

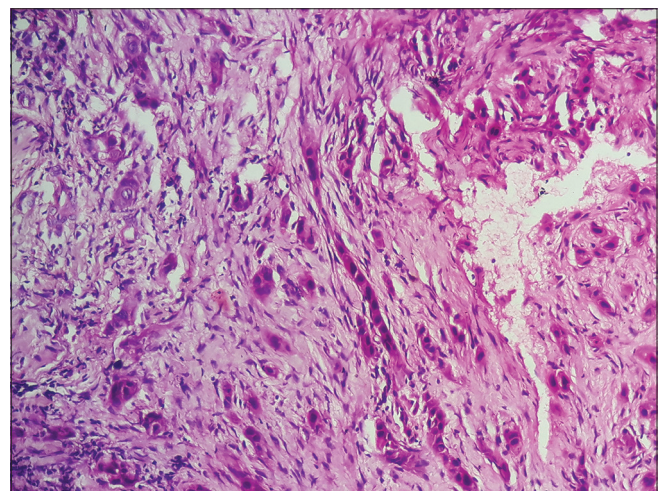
large cystic space, or cord-like. As aforementioned, the tumor shows infiltrative growth pattern particularly at the periphery. This area shows tumor cells proliferating in single file fashion that resembles “beads on a string” [Figure 1c].<sup>[3]</sup> A corresponding hand drawn picture of single file pattern in polymorphous adenocarcinoma is illustrated in Figure 1d. It was demonstrated that polymorphous low-grade adenocarcinoma contained a significantly higher proportion of reticular, tubular and single file patterns as compared to cribriform adenocarcinoma of the salivary gland containing a higher percentage of papillary, solid and cribriform patterns.<sup>[4]</sup> This distinction has been omitted from the recent WHO Classification of Head and Neck Tumors.<sup>[2]</sup> When cribriform pattern predominates, the distinction from adenoid cystic carcinoma may be difficult; however, polymorphous adenocarcinoma shows cytological uniformity and consistent p63+/p40– profile.<sup>[5]</sup>

Sclerosing odontogenic carcinoma is another rare odontogenic malignancy, which histologically demonstrates single file cord-like infiltrative odontogenic epithelium in sclerosing stroma,<sup>[2]</sup> albeit the phenomenon is not pathognomonic. It is not unusual to find similar pattern of invasion in oral squamous cell carcinoma, particularly at the invasive tumor front [Figure 2].

Interchangeably, the term is used with cord-like pattern as mentioned earlier. Vulval angiofibromatosis shows small cord-like myofibroblastic cells. Rare examples of



**Figure 1:** (a) A hand drawn illustration of Amerindians way of walking along a trail; (b) photomicrograph showing single file arrangement of tumor cells in fibrous stroma in a case of lobular carcinoma of the breast; (c) photomicrograph showing numerous single files of tumor cells in a case of polymorphous adenocarcinoma and (d) the corresponding hand drawn picture (1: Extravasated RBCs, 2: Fibrous stroma, 3: Single files of tumor cells)



**Figure 2:** Photomicrograph of H&E section showing proliferation of tumor cells in single cords in a case of oral squamous cell carcinoma

myxoid liposarcomas feature cell rows which are separated either by myxoid or hyalinized stroma. A similar cord-like pattern is also seen in some cases of hydropic and vascular leiomyomas.<sup>[6]</sup>

Rajesh *et al.* and Hemachandran and Dey in independent cytological studies demonstrated Indian file pattern in various adenocarcinomas; the type of specimen studied however was different.<sup>[7,8]</sup> Latter authors demonstrated the pattern in 7 out of 25 effusion specimens and suggested that when adenocarcinoma cells infiltrate the tissue, they oftentimes evoke a desmoplastic reaction. Further, these carcinoma cells then become entrapped in a linear Indian file configuration.<sup>[8]</sup>

The characteristic pattern of growth in classic invasive lobular carcinoma involves the infiltration of single file of the cells through the stroma with little accompanying disturbance of the normal architecture of the tissue.<sup>[9]</sup> Thus, in connotation with Amerindians way of walking along the trail, which was probably an art of camouflaging for survival, it may be prudent to believe that single file arrangement of the neoplastic cells may be an attempt to infiltrate the tissue without being caught by the body's immune reaction, one of the "hallmarks of cancer."

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### Conflicts of interest

There are no conflicts of interest.

Deepak Pandiar<sup>1</sup>, Smitha T<sup>2</sup>

<sup>1</sup>Department of Oral and Maxillofacial Pathology, Postgraduate Institute of Dental Sciences, Rohtak, Haryana, <sup>2</sup>Department of Oral and Maxillofacial Pathology, V S Dental College and Hospital, Bengaluru, Karnataka, India  
E-mail: smitha.iaomp@gmail.com

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