Are growth phases exclusive to cutaneous melanoma?

Two growth phases, radial and vertical, are commonly identified in cutaneous melanoma. In the radial growth phase, melanoma appears as an irregular plaque; cells may invade the dermis, but do not form a nodule. In the vertical growth phase, the lesion develops vertically, forming a true tumor. Growth phases, generally reputed to be sequential stages of tumor development, are considered to be characteristic of skin melanoma and are not generally recognized in other tumors. However, analyzing other skin neoplasms, some analogies can be noted. Squamous cell carcinoma originates in the epidermis as squamous cell carcinoma in situ, which shows a radial growth pattern, recognizable even when cells superficially infiltrate the papillary dermis; the direction of growth seems to change when cells form a nodule. In mammary and extramammary Paget's disease, atypical cells involve the epidermis, with the lesion showing a horizontal growth pattern; subsequently, cells form a dermal nodule. Porocarcinoma presents as a plaque or a nodule. In plaque-type porocarcinoma, cells are confined to the epidermis or extend the dermis. Such a type of growth pattern, extending horizontally, represents a true radial phase (horizontal porocarcinoma). In nodular porocarcinoma, cells form a true tumor (vertical porocarcinomas). Superficial basal cell carcinoma spreads horizontally on the skin and shows crescentic aggregations of cells, connected to the epidermal basal layer. Such a horizontal growth pattern can persist, with cells remaining confined to the surface of the epidermis. Sometimes, however, neoplastic islands, growing vertically, involve the reticular dermis, forming a nodule. The cited examples suggest that radial and vertical phases may occur in skin tumors other than melanoma. Moreover, carcinoma of the uterine cervix develops within the cervical epithelium, as cervical intraepithelial neoplasia (CIN I–III and carcinoma in situ); subsequently neoplastic cells invade the chorion, but do not form a nodule (microinvasive carcinoma). This type of growth pattern is radial, even if the adjective may not appear to be correct because of the specific anatomy of the cervix, which presents a narrow and curved surface. Subsequently, cervical carcinoma invades deeply, forming a true tumor. Breast carcinoma may develop within the ductal epithelium (intraductal carcinoma); then, malignant cells may infiltrate the stroma in small focel (microinvasive carcinoma). Such a growth pattern, in the same direction as the duct, is analogous to the radial phase of cutaneous tumors. The difference is that in the skin neoplastic growth appears to be radial because a large planar surface is available, whereas in the breast neoplastic growth appears to be intraductal because the space in which the neoplastic process develops is curved, enclosing a lumen. Subsequently, the direction of growth seems to change, becoming perpendicular to the epithelium, analogous to the vertical phase of skin tumors, and a tumor nodule occurs. A similar growth pattern can also be seen in carcinomas of the lung, oesophagus, stomach, colon, and bladder. From this brief analysis, it emerges that growth phases, identified by Clark in melanoma, can be recognized in other cutaneous and extracutaneous tumors, in which however, the different anatomies of the sites of origin may produce different morphological expressions.

References


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