

Basal Cell Carcinoma: Ultrasonography, Doppler and Elastography with Pathological Correlation - A Case Report

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Abstract: Basal cell carcinoma (BCC) is a slow growing, locally aggressive tumor that arises from the basal layer of the epidermis. It is the most common cancer in the fair-skinned population. Risk of developing BCC is 30% and the incidence is continuously increasing worldwide. Basal cell carcinoma is hardly fatal but causes deformation of face. Out of all radiological modality, ultrasonography is used to diagnose of basal cell carcinoma and gives comprehensive study about the anatomical extension of the lesion, exact location, vascularity, and deeper involvement. This detailed knowledge helps in treatment and the cosmetic results of patients Here we are reporting a case of Basal cell carcinoma and ultrasonography, doppler and sono-elastography features are discussed.

Keywords: Basal Cell Carcinoma, Ultrasonography, Colour Doppler, Elastography, Skin Cancers

1. Introduction

Basal cell carcinoma is most common cutaneous tumor involving the face most commonly. Risk of developing BCC is approximately 30% and the incidence is continuously increasing worldwide. The etiological factors are: sun exposure or ultraviolet light exposure history especially in people with history of sunburn and genetic predisposition. Basal cell carcinoma lesions are usually associated in areas exposed to sunlight such as the face, ears, and neck. High frequency ultrasonography helps in non-invasive diagnosis of skin tumors^[1].

2. Case Report

A 75 year old male patient presented to surgery OPD with wound over right side of upper lip from past 6-7 months, which was bleeding on touch. He was referred to radiology department for sonography of the right upper lip and neck to know the involvement of deeper tissue, exact location, and its extension along with lymph node status. On examination it was a small nodular lesion on upper lip - pearly, nodular with rolled up margins. On palpation of neck there was some enlarged neck lymph nodes. Ultrasonography (Hitachi Aloka Arietta S-70, linear high frequency probe 12-18 Hz) revealed a small hypoechoic lesion of size measuring 14x4.2 mm with hyperechoic nodule within, showing marked vascularity on doppler. On elastography hypoechoic lesion of upper lip showing mostly stiff tissue exhibiting dark blue colour and strain ratio of 40 indicating malignant lesion (Score 5 on elastography). USG necks showed reactive lymph nodes in upper jugulo-digastric and submandibular region. Biopsy report confirmed diagnosis of Basal cell carcinoma.

3. Discussion

Skin cancers are divided into two groups—melanomas and non-melanoma skin cancers. In Non-melanoma skin cancers,

75-80% are BCCs. It is slow growing locally aggressive tumour involving the basal layer of epidermis^[1]. Face is the most common location to be involved. The main causative factor responsible for BCC is the chronic UV exposure at the expense mostly UVB rays with length 290-320nm^[2,3]. Other than ultraviolet rays the various other causes are exogenous carcinogens such as exposure to the ionizing radiation, arsenic, industrial chemical substances such as vinyl chloride, polycyclic aromatic hydrocarbonates, as well as alkalinizing agents^[3].

Different types of BCC include nodular, cystic, micronodular, superficial, pigment BCC are described in literature and the differential diagnosis in some cases could be difficult^[4].

Nodular basal cell carcinoma

Nodular basal cell carcinoma involves 60-80% of the cases and occurs most commonly on the skin of the head. Clinically it is presented by elevated, exophytic pearl-shaped nodules with telangiectasia on the surface and periphery. Nodular BCC can extend into ulcerative or cystic pattern. The endophytic nodules are presented clinically as flat enduring plaques. The hemorrhagic lesions can resemble hemangioma or melanoma, especially if are pigmented. The lesions with big sizes and the central necrosis are defined as ulcus rodens. Histology reveal nest-like infiltration from basaloid cells. Differential diagnosis can be made by traumatically changed dermal nevus and amelanotic melanoma^[4].

Cystic BCC

One or more cystic nodes with variable sizes located peripherally to the centrally placed tumor nests.

Sclerodermiform (Morpheiform) BCC

The nests and clusters of tumor cells are bordering by thick fibrotic stroma. Clinically, it is presented as infiltrated plaque with slightly shining surface and not well-defined

borders. Immunohistochemistry manifests expression of smooth muscle alpha-actin in tumor stroma.

Infiltrated basal cell carcinoma

This type of basal cell carcinoma appears as thin bundles of basaloid cells with nest-like configuration placed between the collagenous fibers on the dermis and infiltrating in the depth. Clinically, it is a whitish, compact, not-well defined plaque. It commonly occurs on the upper part of the trunk or the face. Rarely paresthesia or hyperesthesia are present as a symbol of perineural infiltration appeared, especially when the tumor is localized on face. This type is commonly underrated when the borders of surgical excision are rated. Histologically this type appears as thin, nest-like bundles of basaloid cells infiltrating in the dermal collagenous fibers.

Micronodular basal cell carcinoma

Clinically found elevated or flat infiltrated tumors. They ulcerate rarely and have yellow-whitish color when they are flat, ostensibly clear outlines and thick at palpation. Commonly involves the skin of the back. On histology it manifests as small rounded nodules of basaloid cells and minimal palisading.

Superficial basal cell carcinoma

This type appears as erythematous plaque with variable sizes (from several millimetres to more than 10 cm). About 10-30% of all the basal cell carcinoma and commonly located on the body skin. There is an erythematous squamous plaque with clear borders, pearl-shape edge, superficial erosion, without tendencies for invasive growth. The regression areas are presented as pale sections with fibrosis. The differential diagnosis includes Bowen disease, psoriasis, or eczema. The numerous superficial BCC are seen commonly in case of arsenic exposure. Histology manifests as the nests of basaloid cells located subepidermally, with clear connection with the basal layer of the epidermis and no infiltration of tumor cells in the reticular dermis.

Pigment basal cell carcinoma

The pigmentation can be found in different types of basal cell carcinoma including nodular, micronodular, multifocal and superficial BCC, and the color varies from dark brown to black. Histologically appears as the nests of basaloid cells, abundance of melanin and melanophages, and moderate inflammatory infiltrate. The melanocytes are located among tumor nests, while the melanophages are present in the stroma. The differential diagnosis has to be made with malignant melanoma^[4]

There are various diagnostic methods to achieve at a diagnosis of BCC and to differentiate the aggressive variants of the tumour. With the advance development within high-resolution ultrasound equipment, which allow visualization of skin layers, it is able to identify skin tumors and along with that it is possible to describe their morphological and topographical characteristics as well as their size more accurately^[2,5]. Proper diagnosis is the key to selection of the most appropriate treatment. High-frequency ultrasound (12-18 MHz) has a promising role in the evaluation of primary BCC^[2,5,6]. A coupling agent is applied between the skin surface and the probe. The linear probe is applied with minimal pressure perpendicular to the skin surface and moved over the skin to visualize the entire lesion^[3,6]. On high frequency ultrasound basal cell carcinoma appears as heterogeneous hypoechoic lesion with irregular contour and large, focally dense internal echoes, and on colour Doppler shows internal vascularity^[6]. Nodular BCCs appear more oval, and superficial BCCs are more flattened. It is not at all times feasible to recognise the other sub-types, although infiltrative BCC appears as having hypoechoic bands radiating from the central mass to infiltrate the underlying dermis. Evaluation of the depth of invasion with high-frequency ultrasound is associated with the pathologic findings^[4,7]. Most Basal cell carcinoma shows hyperechoic spots on USG which is not seen in melanoma and this point helps in differentiating basal cell carcinoma from melanoma^[7]. High-frequency ultrasound also gives a chance for traditional skin palpation; it can deliver the knowledge about the stiffness of the tissue at and below the skin surface by the technique known as ultrasound elastography (USE). In case of strain elastography, a minimal compression made by the transducer can calculate the rate of change in displacement of tissue^[8]. Malignant lesions exhibit higher strain ratios than benign ones.

Itoh et al gave a scoring on elastography for diagnosis of benign and malignant soft tissue mass. The scoring system is known as TSUKUBA SCORING SYSTEM which is as follows-A score of 1 the entire lesion was mostly in green. A score of 2 means mosaic pattern of green and blue. A score of 3 means that the peripheral part of lesion was green, and the central part was blue. A score of 4 shows the entire lesion was blue, but its surrounding area was not included. A score of 5 indicated that both the entire lesion and its surrounding area were blue. BGR represents typical artifactual three layered aspect blue-green-red seen with cystic lesions^[9]



Figure 1: On ultrasonography of upper lip shows a hypoechoic mass lesion of size 14x4.2 mm with irregular borders and hyperechoic spot within.

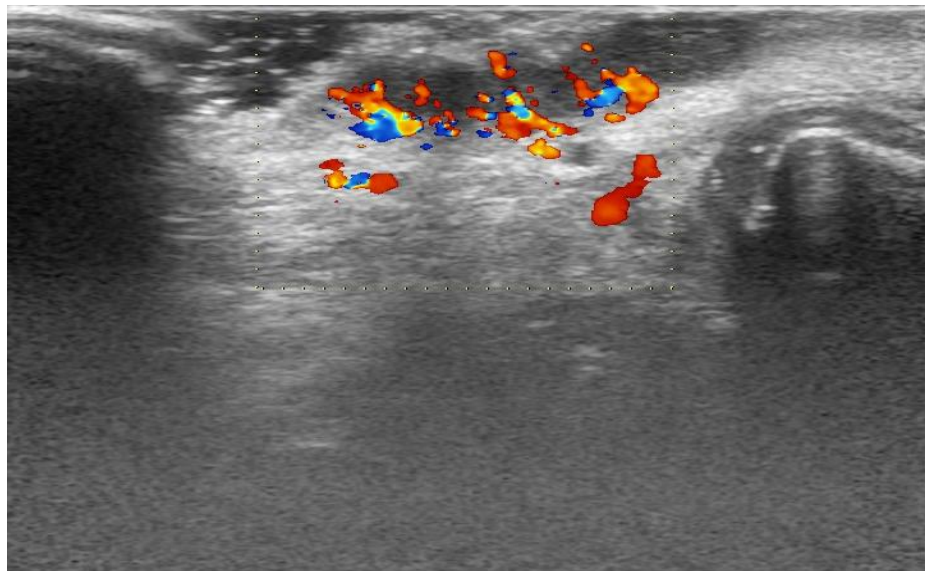


Figure 2: On Colour Doppler ultrasound shows the distribution of vessels (in red and blue) showing marked vascularity inside and at the deep portion of the tumor

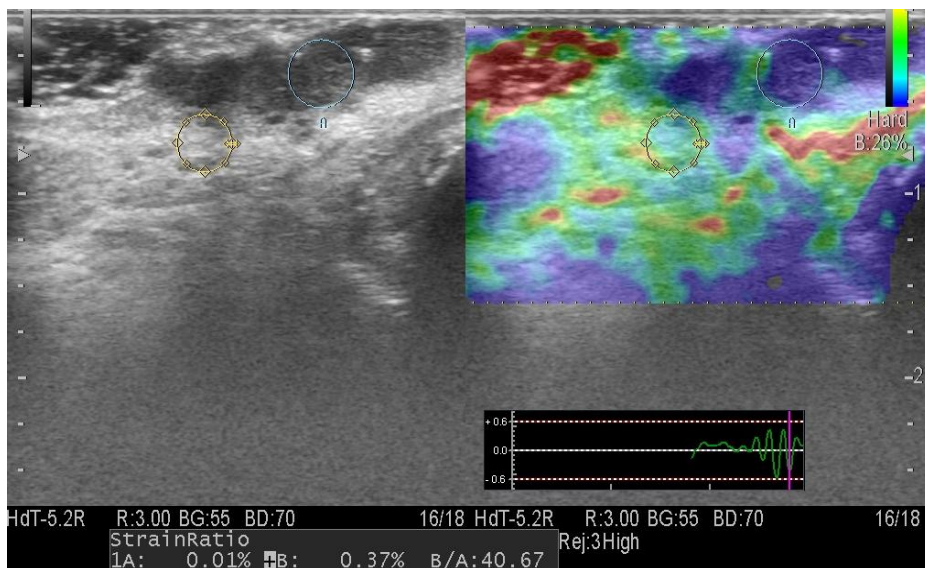


Figure 3: On elastography of the upper lip showing dark blue colour on elastography and strain ratio of 40 indicating malignant lesion (Score 5 on elastography)

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References

- [1] Julia M Baxter, Anand N Patel, Sandeep Varma, Facial basal cell carcinoma. *BMJ* 2012;345:e53422.
- [2] Francisco Bobadilla, Ximena Wortsman, Carla Munoz, C, Laura Segoviad, Miguel Espinozae and Gregor B.E. Jemec, Pre-surgical high resolution ultrasound of facial basal cell carcinoma: correlation with histology, *Cancer Imaging* (2008) 8, 163-172.
- [3] TorstenHinz, Lin-Kristin Ehler, Thorsten Hornung, Harald Voth, Ines Fortmeier, TanjaMaier, TobiasHöller and Monika-Hildegard Schmid-Wendtner, Preoperative Characterization of Basal Cell Carcinoma Comparing Tumour Thickness Measurement by Optical Coherence Tomography, 20-MHz Ultrasound and Histopathology, *Acta DermVenereol* 2012; 92: 132–137
- [4] kshay D. Baheti, Sree Harsha Tirumani, Angela Giardino, Michael H. Rosenthal, Basal Cell Carcinoma: A Comprehensive Review for the Radiologist, *American Journal of Roentgenology*. 2015;204
- [5] Mackiewicz-Wysocka M, Bowszyc-Dmochowska M, Strzelecka-Węklar D, Dańczak-Pazdrowska A, Adamski Z. Basal cell carcinoma–diagnosis. *Contemporary Oncology*. 2013; 17(4):337.
- [6] Mandava.A, RavuriPR, Konathan.R, High-resolution ultrasound imaging of cutaneous lesions, *The Indian journal of radiology & imaging*. 2013 Jul; 23(3):269.
- [7] WortsmanX. Sonography of facial cutaneous basal cell carcinoma: a first-line imaging technique. *Journal of Ultrasound in Medicine*. 2013 Apr; 32(4):567-72.
- [8] Dasgeb.B, Morris.M.A, Mehregan.D, Siegel.E.L, Quantified ultrasound elastography in the assessment of cutaneous carcinoma. *The British journal of radiology*. 2015 Sep 8; 88(1054):20150344.
- [9] AkoItoh, EiUeno, ErikoTohno, HiroshiKamma, HidetoTakahashi, TsuyoshiShiina, MakotoYamakawa, Takeshi Matsumura, Breast Disease: Clinical Application of US Elastography for Diagnosis *Radiology*: 2006; 239(2):341-50.