Line-field confocal optical coherence tomography of basal cell carcinoma : diagnostic performance

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Introduction

Line-field confocal optical coherence tomography (LC-OCT) represents one of the newest non-invasive *in vivo* skin imaging techniques. Previous studies described morphologic criteria of **basal cell carcinoma (BCC)** under LC-OCT examination and suggested that this technique might facilitate BCC diagnosis and subtype discrimination.[1,2] However, data about LC-OCT diagnostic performance in the field of BCC are not yet available.

Objectives

Our goal was to report parameters of LC-OCT diagnostic performance [sensitivity, specificity, positive and negative predictive values (PPV, NPV), accuracy] in the field of BCC.

Method

A total of 337 histopathologically-confirmed lesions, including BCCs and BCC imitators [actinic keratosis; *in situ* squamous cell carcinoma (SCC)/Bowen's disease; invasive SCC; intradermal naevus; seborrheic keratosis; sebaceous hyperplasia; psoriasis; eczema; lichen; lichen planus-like keratosis] were imaged with a handheld LC-OCT device prior to surgical excision. Three observers, all blinded for histopathological diagnosis, retrospectively evaluated clinical, dermoscopic and LC-OCT images of the first 136 study lesions (40.3%) to provide the preliminary results presented/discussed below.

Results

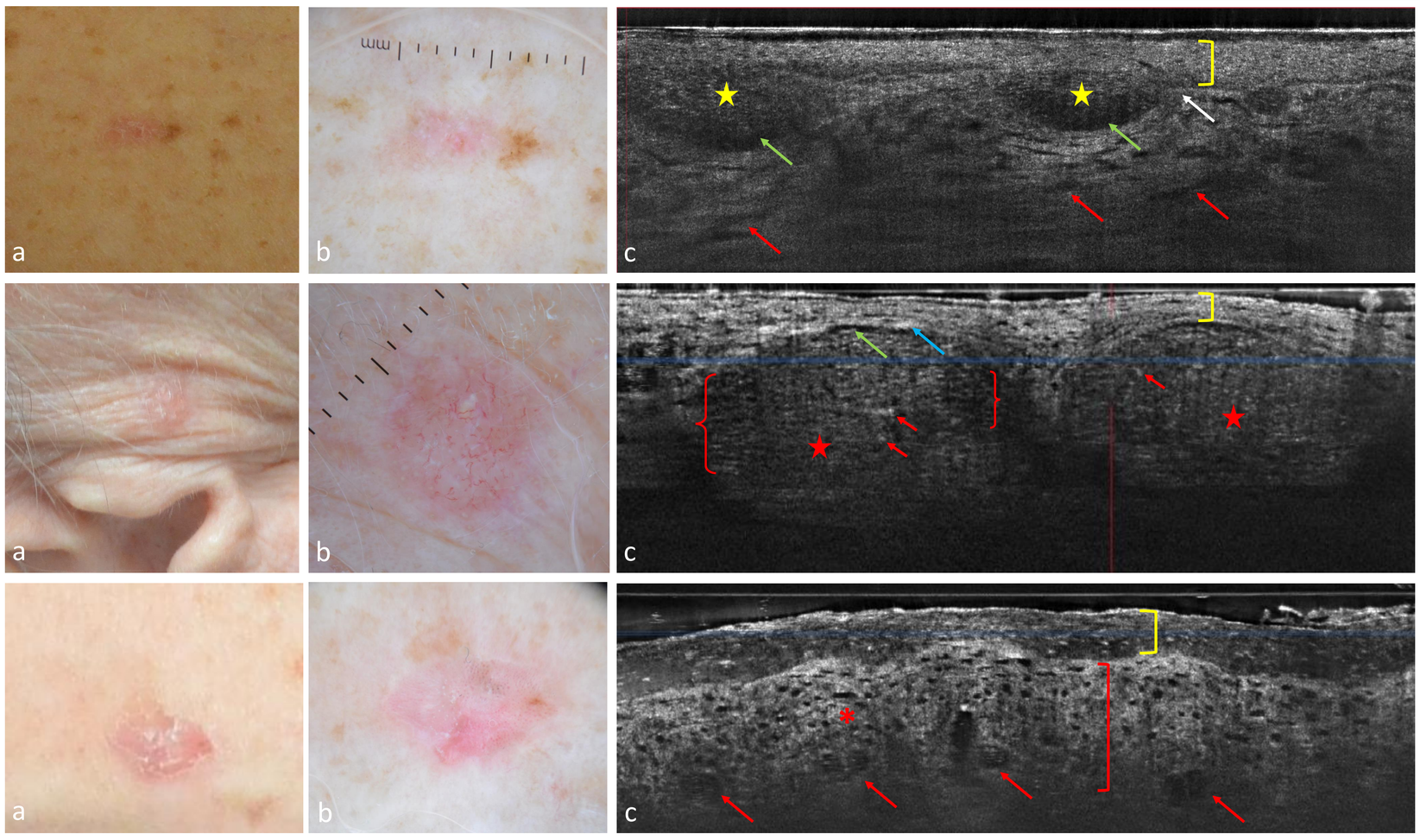

Figure 1. Superficial basal cell carcinoma (sBCC) on the left lateral thigh of a 61 year old woman : (a) clinical, (b) dermoscopic and (c) LC-OCT images. LC-OCT examination reveals the presence of hemispheric lobules composed of an inner grey core featuring the *millefeuille* pattern (yellow stars), surrounded by a dark rim (green arrows). The lobules are connected to the epidermis (yellow brace). The dermoepidermal junction is flat and disrupted by the lobules (white arrow). Dilated blood vessels are visualized in the dermis (red arrows).

Figure 2. Nodular basal cell carcinoma on the left preauricular region of a 79 year old woman : (a) clinical, (b) dermoscopic and (c) LC-OCT images. LC-OCT reveals the presence of round lobules composed of an inner grey core featuring the *millefeuille* pattern (red stars) surrounded by a middle dark rim (green arrow) and an outer bright rim (blue arrow). The lobules are separated from the epidermis (yellow brace). Big bright cells corresponding to melanophages can be seen within the lobules (red arrows). Palisading can be visualized on the borders of the lobule (red braces).

Figure 3. *In situ* SCC/Bowen's disease on the left radial border of wrist of a 41 year old man : (a) clinical, (b) dermoscopic and (c) LC-OCT images. LC-OCT examination reveals the absence of lobules and the presence of hyperkeratosis with parakeratosis (yellow brace), acanthosis (red brace), large and atypical nuclei of keratinocytes inside the epidermis (red asterisk) and roundish hypo-reflective areas corresponding to glomerular vessels (red arrows).

		Histology		
		BCC	non-BCC	Total
Clinic	BCC	47	19	66
	non-BCC	15	55	70
	Total	62	74	136
Dermoscopy	BCC	49	5	54
	non-BCC	13	65	78
	Total	62	70	132
LC-OCT	BCC	60	0	60
	non-BCC	2	74	76
	Total	62	74	136

BCC vs non-BCC	Sensitivity	Specificity	PPV	NPV	Accuracy
Clinic	75.8%	74.3%	71.2%	78.6%	75.0%
Dermoscopy	79.0%	92.9%	90.7%	83.3%	86.4%
LC-OCT	96.8%	100%	100%	97.4%	98.5%

Table 1. Diagnostic performances for the differentiation of BCC from BCC-imitators.

		Histology		
		sBCC	non-sBCC	Total
Clinic	sBCC	14	10	24
	non-sBCC	4	19	23
	Total	18	29	47
Dermoscopy	sBCC	12	10	22
	non-sBCC	4	23	27
	Total	16	33	49
LC-OCT	sBCC	17	5	22
	non-sBCC	3	35	38
	Total	20	40	60

BCC vs non-sBCC	Sensitivity	Specificity	PPV	NPV	Accuracy
Clinic	77.8%	65.5%	58.3%	82.6%	70.2%
Dermoscopy	75.0%	69.7%	54.5%	85.2%	71.4%
LC-OCT	85.0%	71.4%	77.3%	92.1%	86.7%

Table 2. Diagnostic performances for the differentiation of sBCC from others BCC subtypes.

For the differentiation of BCC from BCC-imitators, the following diagnostic performance was found: sensitivity 75.8% (clinical examination), 79.0% (dermoscopic), 96.8% (LC-OCT); specificity 74.3% (clinical), 92.9% (dermoscopic), 100% (LC-OCT); PPV 71.2% (clinical), 90.7% (dermoscopic), 100% (LC-OCT); NPV 78.6% (clinical), 83.3% (dermoscopic), 97.4% (LC-OCT); accuracy 75.0% (clinical), 86.4% (dermoscopic), 98.5% (LC-OCT). Therefore, LC-OCT increased the diagnostic accuracy of the clinical examination by 23.5% and of dermoscopy by 12.1%.

For the discrimination of BCC subtypes, the following diagnostic performance was found: sensitivity 77.8% (clinical), 75.0% (dermoscopic), 85.0% (LC-OCT examination); specificity 65.5% (clinical), 69.7% (dermoscopic), 87.5% (LC-OCT examination); PPV 58.3% (clinical), 54.5% (dermoscopic), 77.3% (LC-OCT examination); NPV 82.6% (clinical), 85.2% (dermoscopic), 92.1% (LC-OCT examination); accuracy 70.2% (clinical), 71.4% (dermoscopic), 86.7% (LC-OCT examination). Therefore, LC-OCT increased the diagnostic accuracy of the clinical examination by 16.5% and of dermoscopy by 15.3%.

Conclusion

The diagnostic performance in the field of BCC can be increased by the use of LC-OCT as compared to clinical and dermoscopic examination alone, both in terms of BCC differentiation from clinical imitators and in terms of BCC subtype discrimination. LC-OCT should be included in the diagnostic process and management of BCC.

References

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