Nail Unit Blue Nevus: A 11-Case Series and Review of the Literature

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Keywords

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Abstract

Background: Blue nevus of the nail apparatus is a rare entity and only isolated cases are reported in the literature. **Objective:** The aim of this study was to better characterize blue nevus at the nail unit. **Methods:** Retrospective analysis of all nail unit blue nevi from the Nail Group of the French Society of Dermatology was compared to the literature. **Results:** Eleven cases were retrieved from 2002 to 2019 with an average age of 45 years. The majority were women (9/11) and acquired (10/11). Hands were more frequently involved (9/11) with a predilection for the thumb and 2 cases were located on the hallux. Nail unit blue nevus mostly presented as a well-delimited blue spot of the lunula (9/11) and histologically was of the common type (10/11). There was no malignancy. **Conclusion:** Nail unit blue nevus is a rare asymptomatic benign entity, mostly acquired on the thumb or the hallux of women. The most frequent presentation is a painless blue spot on the lunula. Congenital blue nevi seem to only affect the paronychium. Main differential diagnosis is melanoma and histopathological examination is mandatory.

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Introduction

Blue nevi are a heterogeneous group of acquired or congenital benign dermal melanocyte proliferation [1, 2]. The pathogenesis is not fully understood, but an embryological migration fault of the melanocytes from the neural crest to the epidermis is hypothesized [2, 3]. The term “blue nevus” comes from the classic blue-gray hue related to the melanin location in the dermis and the reflection of short light wavelengths, in the blue spectrum, by melanin (Tyndall effect) [1, 2].

The lesions are solitary and more frequent in women [1]. There are many clinical and histological variants of blue nevi, but the major subtypes are the common and the cellular blue nevus [1, 2]. Overlap between these subtypes is frequently reported with lesions sharing both histological features [1]. Although very rare, malignant transformation of a blue nevus or melanoma with histopathological features of blue nevus, the so-called “malignant blue nevus” have been described [4, 5]. Blue nevi occur mainly on the skin, but extracutaneous sites have been reported such as oral or genital mucosa, pulmonary or digestive tract, breast and prostate [1]. Another unusual location is the nail apparatus. The first case was described in 1984 by Soyer and Kerl [6].

Table 1. Blue nevus of the nail apparatus: clinical data and pathological diagnosis from the literature

Author	Age	Sex	Fingers/ toes	Nail structures	Clinical manifestation	Onset	Symptoms	Dermoscopy	Histology	Follow- up	Recurrences/ sequelae
1 Soyer and Kerl [6]	4	F	L hallux	Proximal nail fold	Well-circumscribed blue-black lesion 1.2×0.4 cm on proximal nail fold and satellite lesions	C	NR	NR	Combined nevus	NR	L thumb amputation
2 Vidal et al. [7]	20	M	R hallux	Hyponychium (small extension on distal nail bed)	0.9-cm subungual blue nodule on hyponychium with plate uprisng	C	Slight pain since few months	NR	Common blue nevus	NR	NR
3 Duhard [14]	50	F	L thumb	Distal and proximal matrix	Lunular blue lesion with distal fissuring of the nail plate	A (20 years)	No pain	NR	Atypical cellular blue nevus	NR	L thumb amputation
4 Causeret et al. [10]	42	F	L hallux	Distal matrix	Ovoid-shaped blue spot on the lunula with ethnic LM on several nails	A (6 months)	Discomfort in shoes	Homogenic blue spot and gray regular LM	Cellular blue nevus	1 year	No recurrence Sequelae not specified
5 Smith et al. [22]	61	M	3rd R finger	Proximal matrix	Wide (almost total) heterogeneous melanonychia brown-black melanonychia	A (2 years)	NR	NR	Common blue nevus	2 years	No recurrence Sequelae not specified
6 Moulonguet-Michau and Abimelec [11]	42	M	R thumb	Proximal matrix	Triangular blue-black macule in the lateral part of lunula with irregular longitudinal groove in the nail plate	A (1 year)	NR	NR	Common blue nevus	2 years	No recurrence and no sequelae
7 Moulonguet-Michau and Abimelec [11]	32	F	L hallux	Distal matrix	Blue macule on the lateral part of lunula	A (5 years)	NR	NR	Common blue nevus	3 years	No recurrence Sequelae not specified
8 Kim et al. [21]	44	F	R thumb	Distal matrix	Irregular LM with blue lesion on the lunula	A (5 years)	NR	NR	Common blue nevus	NR	NR
9 Dalle et al. [13]	34	F	2nd R finger	Distal and proximal matrix	Blue-gray well-delimited, semicircular spot in the middle of the lunula with superficial linear erosion of the nail plate and discrete LM	A (10 years)	NR	Homogeneous blue lesion on the lunula with filiform hemorrhages	Common blue nevus	2 years	No recurrence and no sequelae
10 Naylor et al. [17]	40	F	4th L finger	Distal matrix and proximal nail bed	Semicircular dark blue discoloration of 0.9 × 0.7 cm on the lunula and extension in the proximal nail bed and pseudo-clubbing	A (childhood)	No complaint	NR	Combined blue nevus	1 year	No recurrence Partial dorsal pterygium

Table 1 (continued)

Author	Age	Sex	Fingers/ toes	Nail structures	Clinical manifestation	Onset	Symptoms	Dermoscopy	Histology	Follow- up	Recurrences/ sequelae
11 Gershtenson et al. [8]	21	F	2nd R toe	Matrix, nail bed, and perionychium	1.7×2.3 cm irregular plaque on the proximal and lateral nail folds, with LM	C	No complaint	NR	Cellular blue nevus	1 year	No recurrence
12 Lee et al. [20]	64	F	3rd L finger	Distal matrix and nail bed	LM (25% the 80%)	A (3 years)	Asymptomatic	NR	Common blue nevus	4 years since the first biopsy	No follow-up after complete excision. Graft
13 Göktay et al. [19]	48	M	3rd R finger	Distal matrix and large extension on the nail bed	Irregular LM	A (1 year)	NR	Irregular melanonychia with (borders) pseudo-Hutchinson	Common blue nevus	NR	NR
14 Dogan [9]	39	F	2nd L finger	Distal and proximal matrix	Lunular blue lesion and longitudinal fissuring	A (15 years)	Slight pain if trauma or pressure	Structureless lunular blue lesion with extension under the proximal nail fold and filiform hemorrhages	Common blue nevus	NR	NR
15 Klufas et al. [12]	47	M	R hallux	Proximal nail bed	0.2-cm lunular blue lesion	A (1 year)	Asymptomatic	Homogeneous blue lesion	Common blue nevus	NR	No recurrence
16 Mochel et al. [15]	32	F	L thumb	Proximal matrix	Lunular blue-gray lesion and small longitudinal groove	A (3 months)	NR	NR	Cellular blue nevus	8 months	No recurrence and no sequelae
17 Fachal et al. [16]	35	F	L thumb	Distal and proximal matrix	0.5-cm lunular blue-black lesion and longitudinal groove	A (5 years)	NR	Structureless homogeneous blue lesion	Common blue nevus	NR	NR
F, female; M, male; R, right; L, left; C, congenital; A, acquired; NR, not reported/not realized; LM, longitudinal melanonychia.											

Table 2. Blue nevus of the nail apparatus: clinical data and pathological diagnosis from our cases

Patient	Age	Sex	Fingers/ toes	Nail structures	Clinical manifestation	Onset	Symptoms	Dermoscopy	Histology	Follow-up	Recurrences/ sequelae
1	29	F	3rd L finger	Distal and proximal matrix	Lunular blue lesion with distal plate fissuring	A	Asymptomatic	Structureless homogeneous blue lesion, pseudo-Hutchinson and distal fissuring	Common blue nevus	1 year	No recurrence
2	26	F	R thumb	Proximal nail fold	2×0.5-cm well-delimited blue dark lesion on proximal nail fold	C	Asymptomatic	Homogeneous blue dark nodule	Common blue nevus	2 months	No recurrence
3	48	F	2nd R finger	Distal matrix and proximal nail bed	Blue-black lesion on lunula and extension on the nail bed	A	Asymptomatic	NR	Atypical cellular blue nevus	1 year	No recurrence
4	NR	F	R thumb	Distal matrix	Punctiform blue-black lesion of 2.5 mm on lunula	A	Asymptomatic	NR	Common blue nevus	NR	No sequelae
5	48	F	R thumb	Distal matrix and proximal nail bed	Blue-black lesion on lunula and LM of 6 mm	A	Asymptomatic	NR	Common blue nevus	2.5 years	Recurrence
6	28	F	L thumb	Distal matrix	2 mm blue-black lesion on lunula	A	Asymptomatic	Homogeneous blue lesion	Common blue nevus	1 month	NR
7	63	F	L great toe	Distal matrix	Lunular blue lesion and longitudinal erythronychia	A	Asymptomatic	Homogeneous blue lesion and discrete longitudinal erythronychia	Common blue nevus	3 years	No recurrence
8	55	M	R thumb	Intermediary and distal matrix	Lunular blue lesion and LM	A	Asymptomatic	Homogeneous bands with sharp edges	Combined blue nevus with a lentiginous proliferation	1 year	No recurrence
9	24	F	4th L finger	Distal and proximal matrix with proximal nail bed extension	Lunular blue lesion and small extension on the nail bed	A	Asymptomatic	NR	Common blue nevus	1 year	No recurrence
10	76	F	L thumb	Distal matrix and nail bed	Lunular blue lesion and extension on the nail bed	A	Asymptomatic	NR	Common blue nevus	1 year	No recurrence
11	51	M	L great toe	Distal nail bed	Blue dark lesion on the distal bed nail	A	Asymptomatic	NR	Common blue nevus	1 year	No recurrence

F, female; M, male; R, right; L, left; C, congenital; A, acquired; NR, not reported/not realized; LM, longitudinal melanonychia.

Fig. 1. Clinical (a) and dermoscopic (b) aspects of a typical nail unit blue nevus, presenting as a well-delimited blue spot on the lunula (patient 6).

Fig. 2. Nail unit blue nevus with blue spot on the lunula associated with longitudinal erythronychia (patient 7).

Fig. 3. Blue nevus presented as lunular blue lesion and LM (patient 8). LM, longitudinal melanonychia.

Since then, a literature review mentions 16 other cases. Their clinical and histological characteristics are reported in Table 1.

Objective

The aim of the study was to collect all cases of nail unit blue nevi from the Nail Group of the French Society of Dermatology and to compare our data with those of the literature in order to better characterize this rare entity.

Materials and Methods

As a multicentric retrospective study, all cases of nail unit blue nevi were collected. Diagnosis was established by nail experts on the basis of clinical presentation and histological features. Surgical excision of the entire lesion was performed in all patients. All clinical information, clinical and histopathological pictures – and if possible, intra- and postoperative images – were reviewed.

Color version available online

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Fig. 4. Congenital blue nevus on the proximal nail fold of the right thumb (patient 2).

Fig. 5. Pre- (a) and intraoperative (b) pictures of nail unit blue nevus located on the distal nail bed (patient 11).

Color version available online

Fig. 6. a, b Histopathological features of common blue nevus. Dermal heavily pigmented proliferation of spindle melanocytes, clearly separated from the overlying epidermis. There is no melanocytic proliferation at the dermal-epidermal junction, and no cellular pleomorphism, nor mitosis or tumoral necrosis in the dermis (patient 2).

Results

Eleven cases of nail unit blue nevi were retrieved from 2002 to 2019 with an average age of 45 years (24–76 years) (Table 2). The majority were women (9/11). Ten cases were acquired and one was congenital. Hands were more frequently involved (9/11) with a predilection for the thumb in 6 cases out of 9. Two nail unit blue nevi were

located on the great toe. Clinically, blue nevi on the nail apparatus mostly presented as a well-delimited blue spot of the lunula (9/11) (Fig. 1). Two of them extended to the proximal matrix, and 1 case was associated with subsequent discrete distal fissuring of the plate. Another one was associated with longitudinal erythronychia (Fig. 2). Three extended to the proximal bed and 1 along the whole length of the nail bed. Two nail unit blue nevi were asso-

Fig. 7. Histopathological features of a combined blue nevus: discrete, noncontinuous lentiginous melanocyte proliferation above a dermal proliferation of pigmented, dendritic spindle melanocytes. This lesion was presenting clinically as lunular blue lesion and LM (patient 8). LM, longitudinal melanonychia.

ciated with longitudinal melanonychia (LM) (Fig. 3). One blue nevus was located on the proximal nail fold (Fig. 4) and 1 was isolated on the distal nail bed (Fig. 5).

Histologically, all blue nevi were of the common type (Fig. 6) except 1 cellular case showing atypical features without sign of malignancy. One of the common nail unit blue nevi associated with LM showed discrete, noncontinuous lentiginous proliferation of melanocytes in the basal cell layer of the matrix epithelium (Fig. 7).

Discussion

Blue nevi of the nail unit are rare with only 17 cases published up to now. All of them were isolated cases. With 11 cases, we herein report the largest series. Our results confirm the data from the literature (Table 3). The patients were mostly women which is consistent with the marked women's predominance found in the already published cases (70.5%). There is no explanation for this female predilection. The majority of nail unit blue nevi is acquired, like on the skin [3]. Our series reported 1 congenital case, located on the proximal nail fold (Fig. 4). Soyer and Kerl [6] also reported 1 congenital case on the dorsal nail fold but with satellite lesions. The 2 others reported congenital lesions were on the hyponychium [7] and 1 spreading all around the nail unit [8]. There is no case of multiple nail blue nevi. None of our patients com-

Table 3. Comparison of literature cases to our case series

Literature (17 cases)	Our series (11 cases)
Female/male: 12:5	Female/male: 9:2
14 acquired/3 congenital	10 acquired/1 congenital
11 fingers: 5 thumb	9 fingers: 6 thumb
6 toes: 5 great toe	2 toenails: 2 great toe
5 LM	2 LM
	1 longitudinal erythronychia
Matrix: 11	Matrix: 5
Distal matrix: 5	Distal matrix: 3
Proximal matrix: 3	Proximal and distal matrix: 1
	Intermediary and distal matrix: 1
Matrix and nail bed: 2	Matrix and nail bed: 4
Nail bed: 1	Nail bed: 1
Proximal nail fold: 1	Proximal nail fold: 1
Hyponychium and nail bed: 1	
Diffuse: 1	
11 Common blue nevus	9 Common blue nevus
3 Cellular blue nevus	1 Atypical cellular blue nevus
	1 combined blue nevus with a lentiginous proliferation
1 Atypical cellular blue nevus	
2 Combined blue nevus	
LM, longitudinal melanonychia.	

plained of symptoms, but some authors reported discomfort, accentuated by pressure [7, 9, 10].

The fingers are more often involved; 81.8% in our series and 64.7% in the other cases. Thumbs and halluces are the most common location. This could be explained by their larger matrix. In our series, the most frequent manifestation of nail unit blue nevi was a blue spot on the lunula (Fig. 1). This clinical presentation was also reported by Causeret et al. [10], Moulounguet-Michau and Abimelec [11], and Klufas et al. [12]. One of the cases with proximal matrix involvement was associated with distal plate fissuring. Several cases were also described with distal fissure and longitudinal groove [9, 11, 13–16]. Four patients had a blue nevus extending in the nail bed. Naylor et al. [17]

Fig. 8. A tattooed distal nail bed (pencil lead) (a) and a painless glomus tumor (b) mimicking nail unit blue nevus.

reported 1 case of blue nevus with a large extension on the nail bed associated with pseudo-clubbing.

Vidal et al. [7] reported a blue nevus on the hyponychium. We report the 2nd case of nail unit blue nevus on the nail bed without matrix involvement [12]. The blue nevus predilection for the matrix, especially the distal one, could be explained by the density and activity of melanocytes in the different nail structures. Actually, in the matrix, melanocyte density is about $200/\text{mm}^2$, mainly dormant in the proximal matrix, dormant and activated in the distal matrix. In the nail bed, melanocytes are absent or only in very low density ($50/\text{mm}^2$) and they are dormant [18]. Nevertheless, blue nevi are presumably linked to a failure of embryonic migration that could explain this unusual location. In the literature, 5 cases of nail unit blue nevi were reported with LM [10, 19–22]. Except for the case of Causeret et al. [10] who described typical multiple ethnic melanonychia striata, the other authors did not offer any explanation concerning these melanonychia. It is surprising to have melanonychia in blue nevi as this dermal lesion has no connection with the matrix epithelium. One may hypothesize that LM in the blue nevus results from melanocyte activation in the epithelium that lies above the dermal tumor. More rarely, it corresponds to a blue nevus combined with a lentigo as in 1 of our cases (Fig. 7). Unfortunately, the matrix epithelium of the 2nd case with LM was damaged and could not be evaluated. We report the first case of nail unit blue nevus associated with erythronychia (Fig. 2). This might be explained by the mass effect of the tumor causing vascular congestion. The re-

sidual postoperative erythronychia may be sequelae, as frequently observed after nail matrix surgery. Histologically, the vast majority of cases were common blue nevi (Fig. 6) with 1 combined blue nevus and 1 cellular case showing atypical features. There was no malignancy. In the literature, common blue nevus was also the most frequent type but cellular, atypical cellular, and combined blue nevi were also described [6, 8, 10, 14, 15, 17]. No case of “malignant blue nevi” at the nail apparatus has ever been reported. However, the most important differential diagnosis of blue nevus, as for all isolated pigmented lesion, is melanoma. Nodular melanoma of the nail bed should be ruled out when dealing with an isolated pigmented blotch of the nail apparatus as well as a melanoma originating in the matrix when associated with LM. We recommend to always perform a complete excision of the pigmented lesion to have an accurate histopathological diagnosis. Other clinical differential diagnoses are a pigmented foreign body and a painless glomus tumor (Fig. 8).

In conclusion, our series of 11 cases, the largest ever published, shows that nail unit blue nevus is predominantly acquired in women, on the thumb, or the hallux and is asymptomatic. The most frequent localization is the matrix with typically well-delimited blue spot on the lunula, associated or not with nail plate alteration. LM could be associated, mostly because of melanocyte activation. In the rare occurrence of a congenital nail unit blue nevi, it seems to only affect the paronychium. Even if no “malignant blue nevus” has been described, histopathological examination is mandatory to rule out melanoma.

Statement of Ethics

The patients in this study gave written informed consent to publication of their case details.

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Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Author Contributions

All the authors have contributed to the conception of the work and the acquisition and analysis of the data. They have revised the content and approved the final version.

References

- 1 Murali R, McCarthy SW, Scolyer RA. Blue nevi and related lesions: a review highlighting atypical and newly described variants, distinguishing features and diagnostic pitfalls. *Adv Anat Pathol*. 2009;16(6):365–82.
- 2 Phadke PA, Zembowicz A. Blue nevi and related tumors. *Surg Pathol Clin*. 2009;2(3):483–96.
- 3 Zembowicz A, Phadke PA. Blue nevi and variants: an update. *Arch Pathol Lab Med*. 2011;135(3):327–36.
- 4 Mones JM, Ackerman AB. “Atypical” blue nevus, “malignant” blue nevus, and “metastasizing” blue nevus: a critique in historical perspective of three concepts flawed fatally. *Am J Dermatopathol*. 2004;26(5):407–30.
- 5 Sugianto JZ, Ralston JS, Metcalf JS, McFaddin CL, Smith MT. Blue nevus and “malignant blue nevus:” a concise review. *Semin Diagn Pathol*. 2016;33(4):219–24.
- 6 Soyer HP, Kerl H. European society of pediatric dermatology clinical case reports 1984. In: Baran R, Dawber RPR, Berker DAR, Haneke E, Tosti A, editors. *Diseases of the nails and their management*. 3rd ed. Oxford: Blackwell Science Ltd; 2001. p. 616–8.
- 7 Vidal S, Sanz A, Hernández B, Sánchez Yus E, Requena L, Baran R. Subungual blue nevus. *Br J Dermatol*. 1997;137(6):1023–5.
- 8 Gershtenson PC, Kronic A, Chen H, Konanahalli M, Worobec S. Subungual and periungual congenital blue naevus. *Australas J Dermatol*. 2009;50(2):144–7.
- 9 Dogan S. Subungual blue naevus presenting with leukonychia. *Hong Kong J Dermatol Venereol*. 2016;24:87–91.
- 10 Causeret AS, Skowron F, Viallard AM, Balme B, Thomas L. Subungual blue nevus. *J Am Acad Dermatol*. 2003;49(2):310–2.
- 11 Moulouquet-Michau I, Abimelec P. [Nail unit blue melanocyte nevi: 2 case reports]. *Ann Dermatol Venereol*. 2004;131(11):984–6.
- 12 Klufas DM, Que SK, Berke A, Maryland BS. Acquired blue nevus of the nail bed. *Dermatol Online J*. 2017;23(2):13030.
- 13 Dalle S, Ronger-Savle S, Cicale L, Balme B, Thomas L. A blue-gray subungual discoloration. *Arch Dermatol*. 2007;143(7):937–42.
- 14 Duhard E. *Naevus bleu cellulaire atypique*. Nice: European Nail Society; 1998.
- 15 Mochel MC, Miller CJ, Rubin AI. Subungual pigmented tumor with onychodystrophy: challenge. *Am J Dermatopathol*. 2017;39(9):707–8.
- 16 Fachal C, Pérez-Pérez LC, Allegue F, Calviño S. Subungual blue nevus. *Actas Dermosifiliogr*. 2018;109(1):88–90.
- 17 Naylor EM, Ruben BS, Robinson-Bostom L, Telang GH, Jellinek NJ. Subungual blue nevus with combined phenotypic features. *J Am Acad Dermatol*. 2008;58(6):1021–4.
- 18 Perrin C, Michiels JF, Pisani A, Ortonne JP. Anatomic distribution of melanocytes in normal nail unit: an immunohistochemical investigation. *Am J Dermatopathol*. 1997;19(5):462–7.
- 19 Göktay F, Güneş P, Yaşar Ş, Güder H, Aytekin S. New observations of intraoperative dermoscopic features of the nail matrix and bed in longitudinal melanonychia. *Int J Dermatol*. 2015;54(10):1157–62.
- 20 Lee EJ, Shin MK, Lee MH. A subungual blue nevus showing expansile growth. *Acta Derm Venereol*. 2012;92(2):162–3.
- 21 Kim HS, Kim YJ, Kim JW, Yu DS, Yu DS. Subungual blue nevus. *J Eur Acad Dermatol Venereol*. 2007;21(2):271–2.
- 22 Smith DF, Morgan MB, Bettencourt MS. Longitudinal melanonychia. *Arch Dermatol*. 2003;139(9):1209–14.