

Ingrown nail, optimal clinical and morphological classifications: author's views (own modification) and discussion

The aim of the work: optimal sequence of clinical classification of uncomplicated and complicated incarnation defeat of nails; literature review and main analysis.

Materials and Methods. Over a five-year period (2011–2016) 436 unguis incarnates diagnosis (325 cases of incarnated polyonychomycosis) in 259 (59.4 %) men and 177 (40.6 %) women aged 12–86 were done. In 182 (41.7 %) patients late relapses of mycotic associated onychocryptosis were confirmed after previous surgeries in other clinics.

Results and Discussion. Late compression relapses with monoonychocryptosis are 5–18 % (12.4 % – main statistic), with ingrown nail, combined with onychomycosis – 30–70 % (41.7 % – main statistic), which is also confirmed by our previous studies. It was also confirmed that in 60–65 % of IN cases with the formation of eponycheal hypergranulations (60.3 % – main statistic), their contamination with the mycotic mixed flora is observed. In 82 cases (18.8 % of the sample), the disease occurred against the background of arteries obliterating diseases of the lower extremities of atherosclerosis in 60 (13.76 %) and diabetes in 22 patients (5.05 %). Optimize and implement clinically the new author's version of IN ENMK classification by adding a description of the morphological characteristics of the nail bed; alphanumeric coding, the full "spectrum" of clinical variants of onychocryptosis in non-mycotic and mycotic ingrowth (type 1 – type 5) is maximally encompassed: E (eponychium pathology), N (nail, nail plate), M (matrix deformation), K (comorbid pathology). The main, common in clinical practice, methods of surgery are resection of the nail and removal of the nail plate with eponychectomy and local matrixectomy.

Conclusions. Four-component optimized clinical ENMK classification complemently covers some variants of the clinical course of ingrown nail and lesion morphology, clinically significant pathology, associated diseases. Ingrown nail resection / removal, the blocklike eponychectomy and partial marginal matrixectomy ensures that the nail plate does not grow in the area of resection, narrowing the nail and preventing its ingrowth, is performed by mechanical / chemical excision, which is characterized by relative technical severity of performance.

Key words: onychopathology; ingrown nail; complication; clinical classification.

Introduction. Operations for the pathological incarnation of the nail plate in the eponychium account for a significant percentage of surgical interventions are performed in the outpatient surgical departments [14–16]; their results are not always good; according to various clinic, relapse "ingrowth" is observed in 3–35 % of cases [1, 14, 16]. Frequent case of nail lesions is ingrown nail (IN), i.e., onychocryptosis (incarnation of the nail) and destructive onychomycosis, which occurs in more than half of all calls of onychial pathology [1, 3, 14]. The disease is characterized by chronic pathological compression of the nail plate edge of the eponychium [1, 3, 6] and the development of chronic purulent inflammation in it, often with the necrosis and hypergranulation [3, 7, 16] development.

There is no consensus on the classification of the lesion at presentation. The most popular classification quoted in the literature is that first proposed by Heifetz (1937) and subsequently used by Mogensen (1971) [6, 9, 15] and Mozena (2015) [7]. Grade 1: Pain, reddening and slight swelling of the nail sulcus. Grade 2: As above, accompanied by infection and suppuration. Grade 3: As above with the formation of granulation tissue (sometimes referred to as hypergranulation tissue). The most common form, the distal lateral ingrowing, will be discussed. Similar

classifications were also recommended by Larin (1977), Heifetz and Missouri (1945), Meleshevitch (1985) [6, 14, 15], Vergun (2003) [13], Nadashkevitch and Vergun (2015) [8]. In the adolescent type, three stages of ingrown nail are differentiated [6, 8, 9, 13]: stage one: inflammation, swelling, and pain; stage two: inflammation, pain, non-healing wound and granulation tissue, stage three: plus abscess formation and chronic induration of the lateral nail fold. There is often a fluctuation between stages one to three depending on the patient's care of ingrown toenail. Treatment often depends on the degree of inflammation. According to A. L. Chashnikov (1956) classification [6] there are distinguish three forms of ingrown nail: uncomplicated, complicated and recurrent. Each form of the disease is considered by the author as an independent one and there is no place for the pathogenesis of the disease. Among the classifications, based on the most fully reflected etiopathogenetic moment, is the D.I. Muratov (1972) classification [6, 15]. First degree – the nail is ordinary, complaints of intermittent pain in the fingernail phalange. The second degree – the form of the nail is convex, the thickness is 0.5–1 mm, the growing edge is visible. The angle of ingrowth is from 15° to 30°. The third degree – the nail configuration is tubelike

(a tubular) with a deep ingrowth of the edge of the nail. Its thickness is 2.5 mm, and the angle form of the growing edge is 30°–45°. Fourth degree – the nail has the form of a horn or claw, its thickness is more than 2.5 mm, and the angle of curvature of the growing edge is more than 45°, clinical symptoms of trophic changes in the matrix, tissues of the nail bed and nail are observed. Each severity of the disease according to the above classification can be complicated by inflammation. Also lateral onychocryptosis is distinguished (the nail grows in a lateral tissue). Distal onychocryptosis (ingrowth of a properly growing nail into the distal periungual tissue of the peri-osophilic bed). Incarnated onychopathology due to hypertrophy of eponychial soft tissues (the nail it self does not change). Onychocryptosis caused by a violation of the direction of the nail plate growth (the axis of the nail is displaced, it grows into the perionychial groove or into the soft tissue of the nail bed) [1-4]. Also, the finger nail cryptosis is distinguished. Often, the symptoms of eponychial abscess develop, areas of colliquated necrosis and eponychial granulomas are formed [3, 4, 5, 10, 16]. The disease is characterized by chronic pathological compression of the edge of the nail plate of the eponychium and the development of chronic purulent inflammation in it, often with the formation of necrosis and hypergranulation [14, 16]. In patients with obliterating arterial diseases of the lower extremities, it is often possible to detect a combined lesion: pathological growth of the mycotic affected nail plate [1, 3, 8, 10]. In the previous studies we have established that IN is not only the pathology of the nail plate, but also of eponychial tissues, the growth zone and the matrix; and clinically and morphologically manifesting is the actual changes in the eponychium [10, 13, 14].

The aim of the work – optimal sequence of clinical classification of uncomplicated and complicated incarnation defeat of nails; literature review and main analysis.

Materials and Methods. Over a five-year period (2011–2016) 436 unguis incarnates diagnosis (325 cases of incarnated polyonychomycosis) in 259 (59.4 %) men and 177 (40.6 %) women aged 12–86 were performed. In 182 (41.7 %) patients late relapses of mycotic associated onychocryptosis were confirmed after previous surgeries at other clinics. Conservative treatment was recommended only at early stages of ingrowth [2–5]. Resection of the nail and eponychection are the typical methods of IN surgery. Removal of the affected nails was performed in patients with mycotic lesions (local and systemic fungicide therapies were used). Investigation of the

morphogenesis of the mycotic lesions destructive aspect was carried out [1, 10, 14]. The analysis justifies the feasibility of establishing predictive relationships between clinical variants of chronic purulent necrotic infections and combined comorbidity [2, 6-9].

Results and Discussion. Disease is characterized by chronic pathological compression of the nail plate edge of the eponychium and the development of chronic purulent inflammation in it, often with the necrosis and hypergranulation formation. Therefore, we identified 3 variants of the type of changes in the peri-oral grooves: type I – infiltrative inflammation, type II – acute eponychial abscess, type III – chronic inflammation with the formation of focal necrosis and hypergranulation [16]. This classification was proposed back in 2003 [13], four variants of the clinical course were identified, including the presence of accompanying (comorbid) diseases [8, 9, 13]. This classification has proved to be a good idea for the formation of algorithms of medical care in this pathology [8, 13, 14]. However, there is a clinically probable continuity and intermittency of individual nosological forms and clinical variants of nail lesions, which significantly expands the "spectrum" of diagnostic and technical surgical labor. We investigated the variants of nail changes with onychocryptosis with deformation of the nail plate and bed [3-5, 7, 11]. Also, a clinical classification of destructive onychomycosis and an index of an outgrowth is proposed to optimize the description of surgical onychopathology cases (surgical nail pathology) [1, 11], in particular – with mycotic lesion associated [1, 10, 14].

Late compression relapses with monoonychocryptosis are 5–18 % (12.4 % – main statistic), and with ingrown nail combined with onychomycosis – 30–70 % (41.7 % – main statistic), which is also confirmed by our previous studies. It was also confirmed that in 60–65 % of cases of IN with the formation of eponychial hypergranulations (60.3 % – main statistic), their contamination with the mycotic mixed flora is observed [1, 9-11, 14, 16]. The manifesting and latent-running cases of IN, other chronic and associated nail pathology associated with onychocryptosis are diagnosed. It has been confirmed that the complicated and combined cases of onychocryptosis and mycotic lesions accounted for more than half – 196 (44.95 %) of all observations; cases of uncomplicated IN – 167 (38.3 %) of the sample. In sub-test tubes, the age of patients with surgical onychopathology associated with ingrown nail, 51.8 % – patients 20–40 years of age; Such a lesion was confirmed in 91 patients aged 20–30

years (20.9 % of the total sample) and in the other 97 (22.25 %) – at the age of 30–40. Patients 40–50 year-old including 75 observations (17.2 %); 24 (4.5 %) cases of surgical onychopathology (surgical nail pathology) are persons aged 50–60 years. Incarnated onychopathology in patients of other age groups was relatively rare. The peak frequency of observations of uncomplicated onychocryptosis occurred in the age groups of 20–40 years, the peak of cases of destructive trichophytic lesions with ingrowing of the nail was sublingually in patients 40–50 year-old and 50–60 year-old. Primarily, the left foot hallux was affected – in 213 people (48.85 % of the sample), the right foot – in 145 patients (33.26 %), the presence of abnormal ingrowth of the nail plates of the both feet hallux was detected in other 17.89 % patients. In 82 cases (18.8 % of the sample), the disease occurred against the background of obliterating diseases of the lower extremities arteries by atherosclerosis in 60 (13.76 %) and diabetes in 22 patients (5.05 %). In 113 patients (25.92 % of the total sample), onychocryptosis with deformation of the matrix (longitudinal deformation or untypical transverse central deformation) and the formation of eponychial hypergranulations and local necrosis or osteomyelitis was confirmed by their contamination with the *Candida* spp. and *T. Rubrum* [9, 10, 14], confirms the results of our previous studies, in 37 of them this was the cause of the appearance of distal-lateral onychomycosis. Chronic necrotic-purulent process, proliferation of hypergranulation tissue are good "entrance gates" for the penetration of mycotic infection [1, 16]. Onychomycosis in such cases (mainly in young people) often has the character of secondary disease and can manifest itself as a distant complication in the late postoperative period [14]; can also cause secondary deformations and late relapse of the nail incarnation [1, 9].

I decided to optimize and implement clinically the new author's version of IN "ENMK" classification by adding a description of the morphological characteristics of the nail bed; alphanumeric coding, the full "spectrum" of clinical variants of onychocryptosis in non-mycotic and mycotic ingrowth is maximally encompassed [1-3]: *E (eponychium pathology)*. Type 1 – infiltrative inflammation [7-9]. Type 2 – acute abscess [9, 14]. Type 3 – chronic purulent-necrotic process with the serous or (and) purulent chronic eponychial exudation without granulation. Type 4 – chronic purulent-necrotic inflammation with the formation of focal necrosis and hypergranulation [14, 16]. Type 5 – ingrown toenail associated by purulent eponychial inflammation and periostitis or osteomyelitis or / and subungual exostosis of distal phalanx [7-9, 11].

N (nail, nail plate). Type 1 – the lateral edge of the nail is macroscopically unchanged or slightly changed. Type 2 – lateral nail "spur" (spicula) [4, 7, 12]. Type 3 – the lateral edge of the nail is scalloped or jagged (multiple nail spurs). Type 4 – thickened, festooned and laminated the lateral edge of the nail. Type 5 – focal-stratified the lateral edge of the nail.

M (matrix deformation). Type 1 – the deformation of the nail matrix is absent or insignificant. Type 2 – pronounced marginal longitudinal deformation of the nail matrix. Type 3 – central longitudinal deformation of the matrix and tent-like nail deformation. Type 4 – longitudinal deformation of the matrix with tubular nail deformation (pincer nail) [7, 10, 11]. Type 5 – untypical transverse central deformation with the distal nail incarnation.

C (comorbid pathology). Type 1 – there are no associated nail defects and background vascular and / or neurotrophic pathology of the lower extremities. Type 2 – available accompanying non-fungal deformation of the nail. Type 3 – available accompanying mycotic deformation and destruction of the nail and / or subungual structures. Type 4 – available background vascular and (or) neurotrophic pathology of the extremities [9, 13]. Type 5 – available accompanying lesions of the nail (including fungal lesions) and background vascular and (or) neurotrophic pathology of the extremities [8, 13].

Conservative treatment is indicated only at uncomplicated ingrown nail [5, 7, 10-12]. As it is known, the pathological compression of the nail plate edge of the eponychium bead leads to the emergence of a chronic purulent necrotic process, the growth of hypergranulation tissue, are good "entrance gates" for infection, determines the occurrence of complications [1, 12-14]. Cases of onychocryptosis in diabetic patients should be interpreted as a "diabetic foot"; the success of treatment depends not only on adequate surgical intervention, but also on adequate management of the postoperative period [1, 3, 4, 10, 12, 14]. In cases of complicated onychocryptosis, surgical treatment has early-delayed (eponychial hypergranulation), or urgent (eponychial abscess) character [3, 4-7]. The implementation of the blocklike eponychectomy is the main primary access of incarnation [14, 16], the possibility of expanding access for resection / removing, revision subonycheal structures [9, 13, 14, 16]. The main most common in clinical practice, of surgery methods are resection of the nail and removal of the nail plate [2-4]. Also is practiced widely as a supplement to basic interference the excision of abnormal eponychial tissue and the partial marginal matrixectomy – partial excision ingrown nail matrix by its mechanical excision or

coagulation [2, 7, 12-15]: diathermocauterization, CO₂ (carbon dioxide) laser, chemical – alkalis, acids or phenol.

Conclusions. Four-component optimized clinical ENMK classification fully covers variants of the clinical course of ingrown nail and lesion morphology: E – eponychial inflammation, N – nail plate, M – matrix and growth zone, C – presence of comorbid

clinically significant pathology, background and associated diseases. Ingrown nail resection / removal, the blocklike eponychectomy and partial marginal matrixectomy guarantee that the nail plate would not grow into the area of resection. Narrowing the nail and preventing its ingrowth, is performed by mechanical / chemical excision, which is characterized by relative technical severity of performance.

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З ДОСВІДУ РОБОТИ

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ВРОСЛИЙ НІГОТЬ, ОПТИМАЛЬНА КЛІНІКО-МОРФОЛОГІЧНА КЛАСИФІКАЦІЯ: АВТОРСЬКІ ПОГЛЯДИ (ВЛАСНА МОДИФІКАЦІЯ) І ДИСКУСІЙНІ АСПЕКТИ

Мета роботи: створити оптимальну клінічну класифікацію неускладненого та ускладненого вrostання нігтів на основі аналізу літератури та власних даних.

Матеріали і методи. Протягом п'яти років (2011–2016 рр.) було діагностовано 436 випадків вrostання нігтів у пацієнтів віком 12–86 років (із них 325 випадків інкарнованого оніхомікозу), в 259 (59,4 %) чоловіків і 177 (40,6 %) жінок. У 182 (41,7 %) хворих були підтвержені пізні рецидиви мікотичного асоціативного оніхокриптозу після попередніх операцій в інших клініках.

Результати досліджень та їх обговорення. Пізні рецидиви оніхокриптозу спостерігаються у 5–18 % (12,4 % – наша статистика), при оніхомікотичних інкарнаціях – 30–70 % (41,7 % – результати клінічного аналізу), що підтверджується нашими попередніми дослідженнями. Було також підтверджено, що в 60–65 % випадках вrostання нігтя з утворенням епоніхеальних гіпергрануляцій (60,3 % – наша статистика) спостерігається їх контамінація мікотичною флорою. У 82 випадках (18,8 % вибірки), захворювання перебігало на фоні облітеруючих захворювань артерій нижніх кінцівок атеросклерозу в 60 (13,76 %) та цукрового діабету у 22 пацієнтів (5,05 %). Клінічно оптимізовано і впроваджено нову авторську версію класифікації врослого нігтя “ЕНМК”, з описом морфологічних характеристик нігтьового ложа; наявністю буквенно-цифрового кодування, аналізом повного “спектра” та максимальним охопленням клінічних варіантів оніхокриптозу, включно випадки мікотичного вrostання (за вираженістю усі морфологічні зміни парціально диференційовані на 5 субтипів): Е (епоніхеальна патологія), N (зміни краю нігтьової пластини), М (зміни матриксу та його деформації), К (наявність супутньої коморбідної патології). Основними, прийнятими в клінічній практиці методами хірургічного лікування інкарнацій, є резекція нігтя і видалення нігтьової пластини з епоніхектомією та парціальною матриксектомією.

Ключові слова: оніхопатологія; врослий ніготь; ускладнення; клінічна класифікація.

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ВРОСШИЙ НОГОТЬ, ОПТИМАЛЬНАЯ КЛИНИКО-МОРФОЛОГИЧЕСКАЯ КЛАССИФИКАЦИЯ: АВТОРСКИЕ ВЗГЛЯДЫ (СОБСТВЕННАЯ МОДИФИКАЦИЯ) И ДИСКУССИОННЫЕ АСПЕКТЫ

Цель работы: создать оптимальную клиническую классификацию неосложненного и осложненного вrostания ногтей на основе анализа литературы и собственных данных.

Материалы и методы. На протяжении пяти лет (2011–2016 гг.) было диагностировано 436 случаев вrostания ногтей в 12–86 летних пациентов (из них 325 случаев инкарнированного онихомикоза): 259 (59,4 %) мужчин и 177 (40,6 %) женщин. В 182 (41,7 %) больных были констатированы поздние рецидивы микотического оніхокриптоза после предыдущих операций в других клиниках.

Результаты исследований и их обсуждение. Поздние рецидивы оніхокриптоза наблюдаются в 5–18 % (12,4 % – наша статистика), при оніхомікотических инкарнациях – 30–70 % (41,7 % – результаты клинического анализа), что подтверждается нашими предыдущими исследованиями. Было также констатировано, что в 60–65 % случаях вrostания ногтя с образованием эпоніхеальных гипергрануляций (60,3 % – наша статистика) наблюдается их контаминация микотической флорой. В 82 случаях (18,8 % выборки) заболевание протекало на фоне облітерующих заболеваний артерий нижних конечностей: атеросклероза – у 60 (13,76 %) и сахарного диабета – у 22 пациентов (5,05 %). Клинически оптимизировано и внедрено новую авторскую версию классификации вросшего ногтя “ЕНМК”, с описанием морфологических характеристик ногтевого ложа; наличием буквенно-цифрового кодирования, анализом полного “спектра” и максимальным охватом клинических вариантов оніхокриптоза, включая случаи микотического вrostания (по выраженности все морфологические изменения дифференцированы парціально на 5 субтипов): Е (эпоніхеальная патология), N (изменения края ногтевой пластинки), М (изменения матрикса и его деформации), К (наличие сопутствующей коморбідной патологии). Основными, принятыми в клинической практике методами хирургического лечения инкарнаций, являются резекция ногтя и удаление ногтевой пластинки с эпоніхектомией и парціальной матриксектомией.

Ключевые слова: оніхопатологія; вросший ноготь; осложнения; клиническая классификация.