Acta Derm Venereol (Stockh) 1996; 76: 484–487

Nail Surgery: An Assessment of Indications and Outcome

D. A. R. DE BERKER, M. G. C. DAHL, J. S. COMAISH and C. M. LAWRENCE

Department of Dermatology, The Royal Victoria Infirmary, Newcastle upon Tyne, UK

To examine the merits of nail surgery, we studied the surgical investigation, treatment and the outcome of 78 consecutive patients with nail pathology in the context of their complaint. A diagnosis was reached in 74/78 patients. Thirty-six out of seventy-eight (46%) of patients had tumours, 17/78 (22%) had a dermatosis, 21/78 (27%) had infection or trauma and 4/78 (5%) remained undiagnosed. The presenting complaint was treated with substantial or complete resolution in 66/78 (87%) patients. Ninety-seven per cent (35/36) of those with tumours were cured, including all 5/36 with malignant and dysplastic tumours. Post-operative splitting of the nail was seen in only one patient due to secondary infection of a longitudinal nail unit biopsy. Information from this study demonstrates the diagnostic and therapeutic value of nail surgery within dermatology. ***Key words: biopsy; diagnosis; scarring.***

(Accepted May 9, 1996.)

Acta Derm Venereol (Stockh) 1996; 76: 484–487.

David de Berker, Consultant Dermatologist, Department of Dermatology, Bristol Royal Infirmary, Bristol BS2 8HW, UK.

Nail unit surgery (NUS) is seldom performed outside specialist departments of dermatological surgery. Consequently, many dermatologists have no formal training in the topic and remain reluctant to surgically explore and treat nail unit pathology. This paper describes the wide range of nail unit surgical procedures that can be performed by dermatologists and demonstrates the likelihood of excellent results.

NUS is performed to aid diagnosis, to remove a tumour or to treat an inflammatory or traumatic nail disorder. Diagnostic biopsies may be taken from a focus of disease within the nail unit using a punch biopsy or small ellipse. Larger longitudinal ellipses through nail fold, matrix and nail bed provide the greatest information. Punch biopsies and nail bed ellipses rarely produce scarring. Longitudinal nail biopsies have high scarring potential and are best taken from the lateral margin of the nail unit to minimise disfigurement.

Surgical removal of nail unit tumours is dictated by the nature and exact location of the lesion. When possible, the anatomical boundaries and function of matrix as source of nail plate are heeded to avoid unnecessary scarring. Techniques of sparing and repairing the matrix must be learnt to ensure the best outcome (2–5). Mohs surgery is useful in the excision of malignant nail unit tumours such as squamous cell carcinoma, allowing conservation of a functional and cosmetically acceptable digit (7, 8).

NUS has a role in the treatment of certain inflammatory and traumatic conditions, including the ablation of the lateral matrix of ingrowing nails and the incision of collections of pus. In acute paronychia, with subungual localisation of pus, failure to achieve early drainage of matrix compression by removal of part of the proximal nail plate may result in irreversible matrix damage and nail dystrophy.

A good understanding of nail unit biology and repair is needed when attempting these three categories of diagnostic, excisional and therapeutic NUS (9). The dermatologist must be confident that he or she has chosen the correct approach and has a good chance of helping the patient without leaving an unacceptable scar. We have documented the details of 78 patients with nail unit disease requiring surgery over an 18-month period, demonstrating the range of problems, techniques and outcomes that they present.

MATERIALS AND METHODS

Seventy-eight consecutive patients referred by local general practitioners and dermatologists (female: 45, male: 33, age: 9–78) underwent NUS by one of four clinicians over a period of 18 months. Following biopsy, a diagnostic category was attributed. These were one of Tumour, Dermatosis or Infection/Traumatic (Table I). Patients were followed until healed or as indicated by the pathology.

RESULTS

Primary complaint

Dystrophy was the most common presenting feature resulting in referral ($n=27$, 35%), followed by pain ($n=23$, 29%), focal swelling ($n=20$, 26%) and discoloration ($n=8$, 10%). Most patients had more than one of these clinical characteristics. Within the separate diagnostic groups, dystrophy was the most common primary feature in dermatoses affecting the nail unit, pain in infective conditions and swelling in tumours of the nail unit.

Procedure

Procedures were performed on 48 toes and 31 fingers, with one subject having surgery at two sites. A diagnosis was achieved or confirmed by a surgical procedure in 74 of 78 cases. Forty-four per cent (34/78) of all cases had a diagnostic biopsy (Fig. 1).

In 44 cases (56%) excision was performed as a combined diagnostic and therapeutic procedure. This was the main therapy for tumours of the nail unit (32/36, 89%) and in ingrowing toenails ($n=8$). In 4 cases, a diagnostic biopsy was obtained prior to therapeutic excision.

In 6 cases, surgery entailed drainage rather than excision. These were three myxoid cysts treated by puncture followed by triamcinolone injection ($n=1$) or cryosurgery ($n=2$) and three acute bacterial paronychias drained under local anaesthesia.

Diagnosis

Thirty-six tumours, 17 dermatoses and 21 infective or traumatic conditions involving the nail unit were identified. In 4 cases no diagnosis was made.

 ISSN 0001-5555

Table I. *Diagnostic categories and outcomes of patients with nail surgery*

Diagnosis	No	Procedure		Response of primary complaint	
		Biopsy or drainage	Excision as therapy	No change	Complete or partial cure
Tumours					
Exostosis	7		●●●●●●●		●●●●●●●
Myxoid cyst	7	●●●	●●●●		●●●●●●●
Fibroma or Fibrokeratoma	8		●●●●●●●●		●●●●●●●●
Glomus tumour	2		●●		●●
Viral wart	2		●●		●●
Squamous cell carcinoma**	2	●●	●●		●●
Malignant melanoma**	2	●●	●●		●●
Dysplastic naevus**	1		●		●
Pyogenic granuloma**	2	●●	●	●	●
Others: angioma, graphite implantation, myxoid neutrifibroma	3		●●●		●●●
Total	36	9†	32	1	35
Dermatoses					
Psoriasis	5	●●●●●		●●	●●●
Lichenoid	5	●●●●●		●●	●●●
Spongiotic	2	●●		●●	
Darier's	1		●		●
Pemphigoid	1	●			●
Lentigo	1		●		●
Discoid lupus	1	●			●
Lymphoedema	1	●		●	
Total	17	15	2	7	10
Infection & Others					
Bacterial paronychia	4	●●●	●		●●●●
Fungal dystrophy	4	●●●●			●●●●
Scabies	1	●			●
Trauma	4	●●●●			●●●●
Ingrowing	8		●●●●●●●●		●●●●●●●●
Undiagnosed	4	●●●●		●●*	
Total	25	16	9	2	21
TOTAL	78	40†	43	10	66

● = Single case.
† One pyogenic granuloma and the malignant tumours had diagnostic biopsies followed by excision.
* Two patients were lost to follow-up.
** Some patients had diagnostic biopsies prior to definitive surgery.

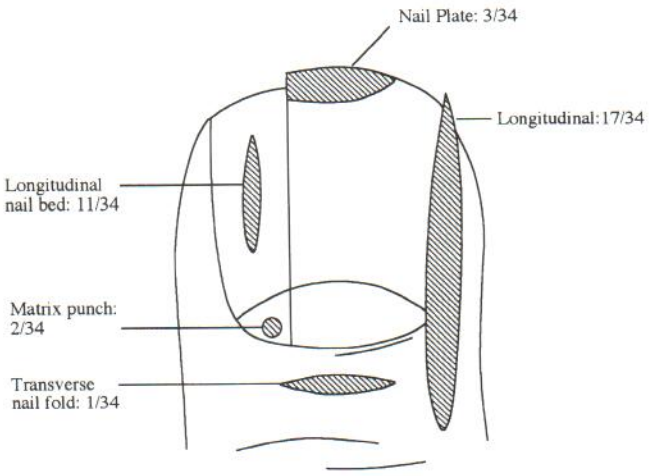

Fig. 1. Range of diagnostic biopsies performed.

Response of primary complaint

In 66/78 (87%), there was complete or partial resolution of the presenting complaint after surgical intervention with subsequent medical treatment when indicated. The best outcome was in the tumour and infection/traumatic categories, where complete or partial resolution was seen in 35/36 (97%) and 21/23 (91%), respectively. One tumour failed to resolve. This was multiple and recurrent pyogenic granulomas of the nail unit. Dermatoses improved or resolved in 10/17 (59%) cases. This followed medical therapy, such as antifungal or steroid treatment.

Post-operative scarring

Many of the primary complaints had scarring as an additional feature. Resolution of the primary complaint was not synonymous with resolution of scarring. A common concern is

the risk of producing increased scarring, or scarring that is not justified by the significance of the disease. Scarring can usually be anticipated and the nature of the post-operative disfigurement made clear to the patient before surgery. A total of 17 (22%) cases suffered cosmetically significant scarring such as a split, ridge or pterygium, but only one patient suffered scarring in excess of that predicted because of secondary infection. Of the remaining 16 with appropriate scarring, 9 were therapeutic ablations of lateral nail.

Removal of 7 tumours resulted in significant scarring due to extension of tumour to the nail matrix. Five of the tumours were malignant or dysplastic (2 squamous cell carcinomas, 2 malignant melanomas, one dysplastic naevus), where the need to ensure tumour clearance had a higher priority than conservation of matrix.

We have chosen to classify scarring as an adverse aesthetic outcome of cosmetic significance. Technically, all nail surgery involving the matrix will result in scar formation, although biopsies of less than 3 mm diameter taken from distal matrix may heal with no subsequent changes in the nail plate. Longitudinal biopsies produce scarring manifested as reduced total nail width. Where the location of the pathology allowed, 15 diagnostic longitudinal biopsies were performed at the lateral margin. No splits arose with this technique, although the contour of the nail folds was altered in some, with the curved junction between the lateral and proximal nail folds becoming more angular.

DISCUSSION

This study demonstrates the range of nail unit pathologies that can be surgically investigated and treated by dermatologists. Tumour excision provides the clearest example of the benefits of NUS with 32/36 (89%) resolving completely.

Diagnostic biopsies in dermatoses or dystrophies of unclear aetiology resulted in improvement following indicated therapy in 10/17 (59%) cases. This is a figure that should be made clear to the patient when the biopsy is undertaken; there is no guarantee of beneficial outcome. However, within this group of patients, biopsy provides more than simple direction of treatment. In cases of dystrophy in an isolated digit, it is important to exclude malignancy. Chronic dystrophy of a single nail is a classic presentation of squamous cell carcinoma (7), and in the absence of a definite diagnosis this should always be excluded by biopsy. Definite negatives are a useful part of dermatological investigation and diagnostic biopsy may be the only way of providing certainty.

Hanno et al. (6) reported the histological outcome of twenty lateral longitudinal biopsies performed to investigate nail dystrophy. The clinical diagnosis was confirmed in 8 of the 20 cases. In our study, the diagnostic value of biopsy was higher, with diagnostic information yielded in 16/17 (94%). No comment was made by Hanno on scarring, or benefit to the patient arising from therapy directed by information gained at biopsy.

Scarring of the nail unit should be weighed against the benefits of NUS. The cosmetic outcome of the procedure can usually be predicted and made clear to the patient. An unacceptable outcome is one that is worse than that anticipated by the patient. Even if the diagnosis is made and the pathology removed, if the appearance is worse than that clearly explained pre-operatively, the outcome is unsatisfactory. Conversely, complete loss of the nail unit may be acceptable if this possibility is appreciated before surgery. Our experience is that patients are usually sufficiently motivated by the presence of pathology as to not be deterred from biopsy. Reluctance to operate is perhaps more frequently found in the clinician.

The one patient where the outcome was worse than expected involved a longitudinal biopsy of the middle zone which became infected. Central longitudinal biopsies carry a risk of such scarring and this was compounded by infection. Cleaning the digit thoroughly before surgery is necessary and indicated by the large range of potential pathogens that can be found by routine screening for subungual flora (10). We soak the hand or foot in a warm solution of antiseptic whilst the anaesthetic is taking effect and scrub beneath the nail's free edge. Topical antimicrobials and antiseptic washes were used in all patients post-operatively. Frank infection was extremely rare and prophylactic antibiotics used only when there was a background of dystrophic nail debris which might harbour wound contaminants.

Early work on longitudinal biopsies suggested that if the width of a specimen from the central region of the nail was no greater than 3 mm, the chance of scarring was small (1). Most dermatologists have found this rule unpredictable. Consequently, surgery at the lateral margin is the norm for longitudinal biopsies. This will reduce the width of the nail without producing a split (2–5). If a lateral biopsy is not possible, the risks of scarring from a midline biopsy are reduced if the proximal nail fold is reflected (11). This allows visualisation of the surgical field and helps prevent fusion of adjacent matrix and proximal nail fold wounds, which otherwise tend to merge as a single scar. The likelihood of this can be further diminished by the use of the original nail plate as a splint between the nail fold and matrix post-operatively. If a matrix/proximal nail fold scar forms it is the basis of a pterygium and acts to split the growing nail as a pier on a bridge divides flowing water.

An alternative approach for the investigation of nail dystrophies is the oblique nail biopsy (11). This provides tissue from all the structures in the nail unit apart from the proximal nail fold. It is performed obliquely across the nail unit up to proximal matrix after reflection of the proximal nail fold. Preliminary studies suggest that it may do this without subsequent narrowing of the nail or other scarring, but it is necessary to remove the nail before biopsy and to return it post-operatively to prevent adhesion between the nail fold and biopsy site.

The greatest challenge with diagnostic nail biopsies is in the investigation of longitudinal melanonychia, which requires matrix biopsy. Technique is determined by the characteristics of the melanonychia (2), but the gold standard is the longitudinal biopsy. This is also true for the investigation of dystrophies, where it is not always possible to clinically locate the epithelial origin of the abnormality, even after nail avulsion. A punch or transverse biopsy may demonstrate histopathological abnormalities but it does not mean that these are the cause of the dystrophy – a larger biopsy may show more relevant changes.

We have demonstrated how a wide range of nail unit pathologies can be histologically assessed and treated with a variety of surgical techniques without unacceptable scars. Such an approach ensures that nail disease is fully explored rather than remaining an area of diagnostic and therapeutic frustration. It is important that dermatologists receive appropriate

training to manage nail disease and ensure that the care of pathology in this sphere remains within the scope of dermatology.

REFERENCES

1. Zaias N. The longitudinal nail biopsy. J Invest Dermatol 1967; 49: 406–408.
2. Baran R, Kechijian P. Longitudinal melanonychia (melanonychia striata): diagnosis and management. J Am Acad Dermatol 1989; 21: 1165–1175.
3. Bennett RG. Technique of biopsy of nails. J Dermatol Surg 1976; 2: 325–326.
4. Salasche SJ, Peters VJ. Tips on nail surgery. Cutis 1985; 35: 428–438.
5. Haneke E, Baran R. Nail surgery. Clin Dermatol 1992; 10: 327–333.
6. Hanno R, Mathes BM, Krull EA. Longitudinal nail biopsy in the evaluation of acquired nail dystrophies. J Am Acad Dermatol 1986; 14: 803–809.
7. Mikhail GR. Subungual epidermoid carcinoma. J Am Acad Dermatol 1984; 11: 291–298.
8. Goldminz D, Bennett RG. Mohs micrographic surgery of the nail unit. J Dermatol Surg Oncol 1992; 18: 721–726.
9. Dawber RPR, de Berker DAR, Baran R. In: Baran R, Dawber RPR, eds. Biology of the nail apparatus. Diseases of the nails and their management. Chapter 1. 2nd edn. Oxford: Blackwell Scientific Publications, 1994.
10. Rayan GM, Fluoronoy DJ. Microbiologic flora of human fingernails. Am J Hand Surg 1987; 12: 605–607.
11. de Berker D, Lawrence CM. The oblique nail unit biopsy: in search of non-scarring nail surgery. Br J Dermatol 1994; 131, Suppl. 44: 46.