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REVIEW ARTICLE

CLINICAL-MORPHOLOGICAL FEATURES AND NEW ASPECTS OF KERATOACANTHOMA TREATMENT:NARRATIVE REVIEW

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ABSTRACT
Keratoacanthoma (KA) is a well-differentiated (G1) epithelial tumor characterized by rapid growth, low malignant potential, and a minimal risk of metastasis. The biological behavior of KA remains a subject of scientific debate. The main challenge lies in its significant clinical and histopathological similarity to cutaneous squamous cell carcinoma (cSCC).Clinically, KA is usually easy to recognize because of its characteristic appearance. It presents as a rapidly growing, dome-shaped nodule with a central crater-like depression filled with keratinous material. The tumor typically progresses through three sequential stages—growth, stabilization, and spontaneous regression. The entire cycle usually lasts 3–9 months and often culminates in the formation of an atrophic scar. Histopathological examination remains the only reliable method for distinguishing KA from cSCC. Accurate assessment requires an excisional or deep incisional biopsy, as superficial sampling techniques do not adequately demonstrate the overall architecture of the lesion. The tumor is believed to originate from the hair follicle. The key dermoscopic features shared by both KA and cSCC include white circles, central keratin accumulation, white structureless areas, and linear, branched, hairpin, and glomerular vessels. Because the dermoscopic appearance of KA closely resembles that of cSCC, a definitive diagnosis can only be established by histopathological examination. Current treatment strategies should be individualized according to lesion characteristics, anatomical location, growth pattern, histopathological findings, and patient-related factors. Surgical excision remains the preferred approach when malignancy cannot be excluded or when aggressive clinical features are present. In selected patients, tissue-preserving modalities—including intralesional methotrexate, intralesional 5-fluorouracil, cryotherapy, laser-based techniques, and other conservative approaches—may also be considered. In this narrative review, we summarize the clinical, dermoscopic, and histopathological features of KA and discuss contemporary therapeutic strategies. The analysis is complemented by the authors' clinical experience and dermoscopic observations from routine dermatological practice, highlighting the practical value of dermoscopy in lesion assessment, the selection of representative biopsy sites, and individualized treatment planning.

Keywords: keratoacanthoma; dermoscopy; histopathology;individualized treatment; clinicodermoscopic correlation.

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INTRODUCTION

Keratoacanthoma (KA) is a rapidly growing keratinizing epithelial tumor that continues to pose a diagnostic challenge in dermatopathology due to its close clinicopathological overlap with cutaneous squamous cell carcinoma (cSCC)[1–3]. It typically presents as a dome-shaped nodule with a central keratin-filled crater and develops over a short clinical course. Despite its often characteristic appearance, reliable distinction from invasive cSCC based on clinical features alone remains difficult [1–3, 9, 10].

The biological nature of KA remains controversial. It has traditionally been considered a lesion with a triphasic evolution consisting of rapid growth, a plateau phase, and possible spontaneous regression[2,3,13]. However, this behavior is inconsistent and unpredictable, as a subset of lesions may persist or demonstrate clinically aggressive features[1,3,21]. Consequently, KA is currently regarded as a keratinizing epithelial neoplasm requiring careful diagnostic assessment rather than a uniformly self-limited process [1, 2, 5].

Accurate diagnosis relies on the integration of clinical evaluation, dermoscopy, and histopathological examination. Dermoscopy may provide supportive diagnostic clues by revealing characteristic vascular and keratin-related patterns and may assist in the assessment of crateriform lesions, including KA and cSCC[18,20].

Nevertheless, due to substantial histomorphological overlap with well-differentiated cSCC, histopathological examination remains essential for definitive diagnosis and exclusion of malignancy [1, 2, 18, 21].

Classification

ICD-10: C44 – Cutaneous squamous cell carcinoma.
ICD-11: 2C31 – Keratoacanthoma.
WHO Classification of Skin Tumours (4th Edition, Volume 11, 2018) recognizes keratoacanthoma within the spectrum of keratinocytic tumors, including well-differentiated squamous cell carcinoma, keratoacanthoma type, and keratoacanthoma-like squamous cell carcinoma[6].
ICD-O code: 8071/3.
Synonyms include sebaceous molluscum, horn molluscum, pseudocarcinomatous molluscum, and Gougerot's epithelioma-like verrucoma.

Management of KA is guided by lesion-specific and patient-related factors, including tumor size, anatomical location, growth dynamics, and histopathological findings[7,8]. Although spontaneous regression may occur, the unpredictability of disease course and the potential for aggressive behavior support active therapeutic intervention in many cases.

Surgical excision remains the treatment of choice, while intralesional and other conservative modalities may be considered in selected patients[7,8,19].

Current management strategies emphasize a multidisciplinary approach integrating clinical, dermoscopic, and histopathological assessment to ensure diagnostic accuracy and appropriate therapeutic selection [1,7,18]. A central clinical challenge lies in distinguishing lesions with potential for spontaneous regression from those that may represent or evolve into cSCC [1, 13, 21].

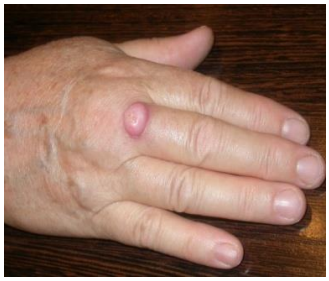
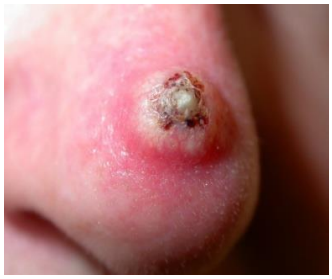
This narrative review provides an updated synthesis of the current understanding of keratoacanthoma, with emphasis on its clinical presentation, diagnostic challenges, dermoscopic and histopathological features, and contemporary treatment strategies. In addition, we present clinical observations derived from routine dermatological practice, with particular emphasis on dermoscopic patterns that may aid diagnostic evaluation.

Clinical Manifestations and Differential Diagnosis

Keratoacanthoma (KA) is characterized by a relatively rapid clinical evolution that distinguishes it from many other cutaneous epithelial tumors. The lesion usually develops within several weeks and presents as a solitary, well-demarcated, dome-shaped or hemispherical nodule with a central keratin-filled crater. The surrounding skin may demonstrate variable erythema, inflammation, or induration.

The classical clinical appearance has been described as a "volcano-like" structure, reflecting the combination of peripheral epithelial proliferation and central keratin accumulation [2,3,11,12].

Figures 1–4 demonstrate the typical clinical presentation of keratoacanthoma in different patients, showing dome-shaped crateriform nodules with central hyperkeratotic plugs and well-defined borders. These characteristic clinical features are highly suggestive of KA; however, similar morphological findings may also be observed in well-differentiated cutaneous squamous cell carcinoma (cSCC), which creates a significant diagnostic challenge and requires further evaluation [1,2,9,10].

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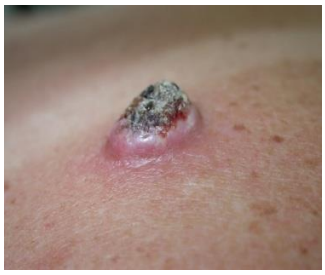
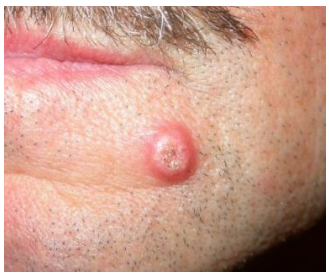



Figure 3,4

Figures 1–4. Classical clinical manifestations of keratoacanthoma in different patients, characterized by dome-shaped crateriform nodules with central hyperkeratotic plugs and well-defined margins.

The early stage of KA is usually represented by a rapidly enlarging erythematous papule or nodule that gradually develops central hyperkeratosis. During the proliferative phase, lesions may increase in size over a short period of time and may reach several millimeters or more in diameter. KA most commonly occurs on chronically sun-exposed areas, including the face, ears, dorsal hands, and forearms, although lesions may develop at other anatomical sites [2,3,5].

Clinically, KA may demonstrate different morphological variants. In addition to the classical solitary form, giant, multiple, eruptive, and atypical variants have been described. These forms may lack the typical crateriform appearance and can present a greater diagnostic challenge, particularly when the clinical picture resembles invasive cSCC or other keratinizing tumors [3,4,14,16,17].

Figure 5 demonstrates a giant keratoacanthoma, representing a clinically distinct variant characterized by marked enlargement, prominent keratinization, and a large crateriform structure. Giant KA may show more extensive local involvement and therefore requires careful assessment to exclude malignant transformation and other aggressive keratinizing tumors [4,14].

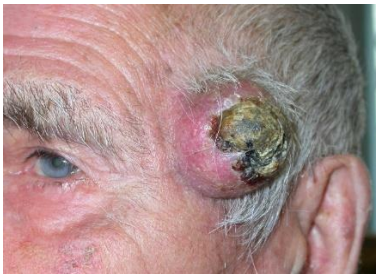


Figure 5. Giant keratoacanthoma showing a large crateriform lesion with a central keratin plug.

Figure 6 shows keratoacanthoma presenting as a cutaneous horn. This variant is characterized by excessive accumulation of compact keratin material forming a horn-like projection and may clinically overlap with other hyperkeratotic lesions, including squamous cell carcinoma [2,5,6].

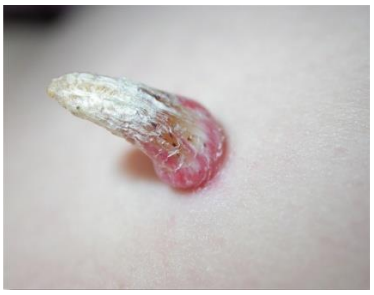


Figure 6. Clinical presentation of keratoacanthoma in the form of a cutaneous horn.

Figure 7 illustrates an atypical clinical localization of KA on the anterior abdominal wall. Although KA predominantly develops on sun-exposed areas, lesions may occasionally occur on less typical anatomical sites, which may complicate clinical recognition and differential diagnosis [3,5].

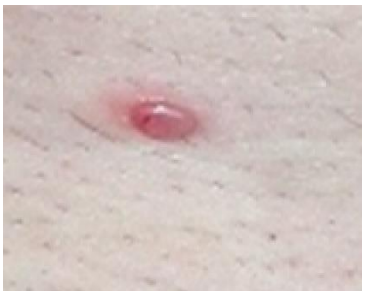


Figure 7. Clinical presentation of keratoacanthoma on the anterior abdominal wall.

The main differential diagnosis of KA includes cSCC, particularly well-differentiated variants, because both tumors may present as rapidly growing keratinizing nodules with central crusting or keratin accumulation. Clinical criteria alone are often insufficient to reliably distinguish between these entities, and histopathological examination remains essential for establishing the final diagnosis [1,2,9,10,21].

Suspicious clinical features such as progressive enlargement, ulceration, bleeding, pain, or persistent growth may indicate the need for biopsy and further pathological assessment.

Other lesions that may mimic KA include irritated seborrheic keratosis, verruca vulgaris, giant molluscum contagiosum, prurigo nodularis, and some adnexal tumors. Inflammatory and infectious lesions may also occasionally simulate KA, particularly when ulceration, crusting, or marked hyperkeratosis are present [2,5,6].

Therefore, clinical examination remains the first and essential step in the diagnostic pathway. Recognition of both typical and atypical clinical patterns allows appropriate selection of biopsy technique, interpretation of dermoscopic findings, and planning of the most suitable treatment strategy.
Because of the close clinical and histopathological relationship between KA and cSCC, a combined clinical, dermoscopic, and histological approach is required for accurate diagnosis and optimal patient management [1,2,7,18].

Dermoscopic Features

Dermoscopy has become an important non-invasive tool in the evaluation of keratoacanthoma (KA), providing morphological details that may not be fully appreciated during routine clinical examination. Because of the substantial clinical overlap between KA and cutaneous squamous cell carcinoma (cSCC), dermoscopic assessment serves as a valuable adjunctive method in the diagnostic process [18,20].

The dermoscopic appearance of KA reflects its characteristic crateriform architecture. One of the most common findings is a central keratin-filled area, appearing as a homogeneous yellow-white amorphous structure corresponding to the clinically visible hyperkeratotic plug. This central keratinization is frequently surrounded by vascular structures located predominantly at the periphery of the lesion [18,20].

Several dermoscopic features have been repeatedly described in KA, including white circles surrounding follicular openings, white structureless areas, central keratin masses, keratin scales, blood spots, and polymorphous vascular patterns. Among the vascular structures, hairpin vessels, linear irregular vessels, and occasionally branching vessels are most frequently observed. These findings reflect active epithelial proliferation and tumor-associated vascular remodeling and contribute to the characteristic dermoscopic appearance of KA [18,20].

The combination of central keratin accumulation, white circles, white structureless zones, and peripheral hairpin or linear irregular vessels creates a pattern that is highly suggestive of KA. Nevertheless, significant overlap exists with well-differentiated cSCC, and dermoscopic findings should always be interpreted in conjunction with clinical and histopathological data [18,20]. Figure 8 presents a schematic summary of the principal dermoscopic features of KA.

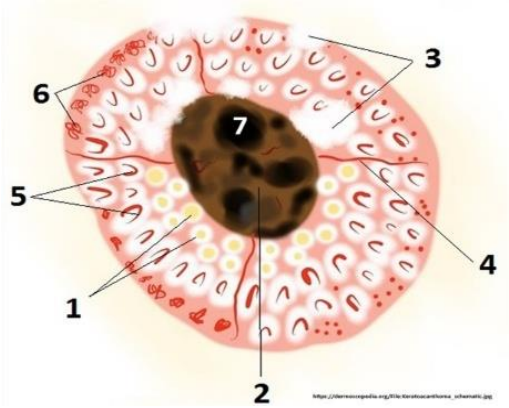


Figure 8. Schematic representation of dermoscopic features of keratoacanthoma.

Figure 9 demonstrates the typical dermoscopic appearance of keratoacanthoma observed in our clinical practice, including central keratinization and peripheral vascular structures.

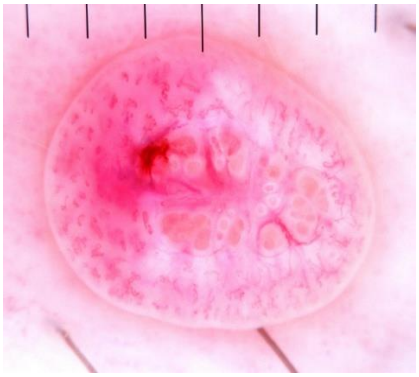
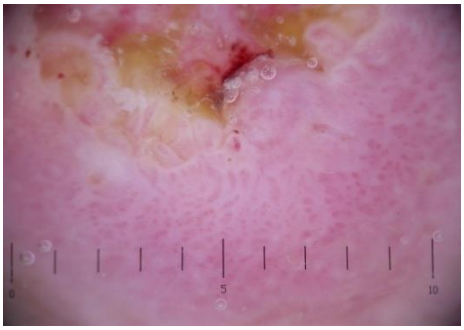


Figure 9. Dermoscopic appearance of keratoacanthoma showing central keratinization and peripheral vascular structures.

Figures 10–1# illustrate dermoscopic findings obtained from patients evaluated and documented as part of the authors' own clinical experience. These original clinical images demonstrate the spectrum of dermoscopic manifestations observed in routine clinical practice, including variations in keratinization, vascular morphology, white circles, structureless white areas, and blood spots.



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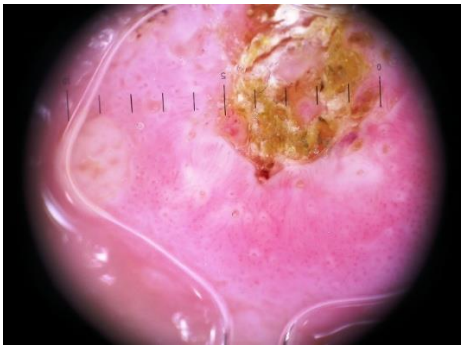

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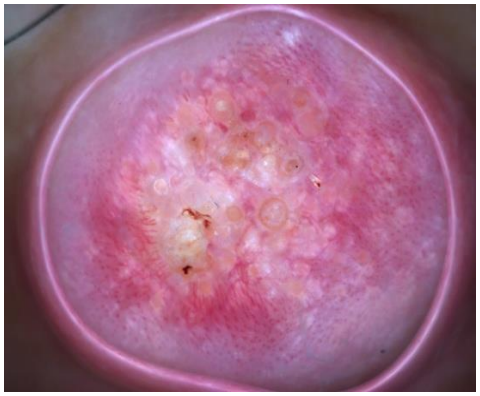

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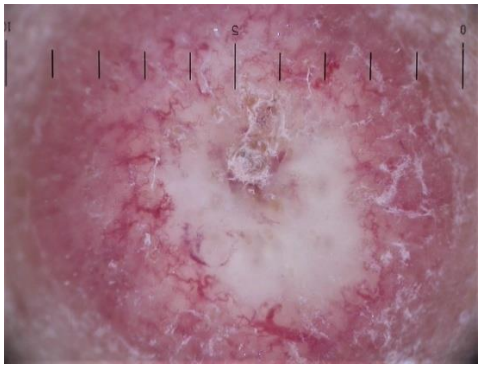

Figure 13.

Figures 10–13. Dermoscopic manifestations of keratoacanthoma in different clinical cases from the authors' clinical archive.

Correlation between clinical morphology and dermoscopic findings is particularly important in everyday practice. Dermoscopy allows better visualization of lesion architecture, facilitates selection of the most representative biopsy site, and improves diagnostic confidence when evaluating crateriform tumors [18,20].

Compared with KA, cSCC often demonstrates greater structural asymmetry, more chaotic vascular patterns, irregular ulceration, and heterogeneous keratin distribution. However, no single dermoscopic criterion is sufficiently specific to establish a definitive diagnosis. Consequently, histopathological examination remains mandatory whenever diagnostic uncertainty persists [1,18,20].

In our experience, dermoscopy played a central role in the assessment of suspected KA. The presence of crateriform architecture, central keratinization, white circles, and characteristic vascular patterns frequently guided biopsy planning and contributed to subsequent therapeutic decision-making.

The integration of clinical examination, dermoscopy, and histopathological evaluation provided a reliable diagnostic approach in our clinical practice.

Histopathology and Diagnostic Criteria

Histopathological examination remains the reference method for confirming the diagnosis of keratoacanthoma (KA).

Despite the availability of clinical and dermoscopic criteria, differentiation between KA and well-differentiated cutaneous squamous cell carcinoma (cSCC) often remains difficult because these lesions share many overlapping morphological features [1,2,5].

Microscopically, KA is characterized by a relatively symmetrical crateriform lesion with a central keratin-filled crater and proliferating squamous epithelium extending into the dermis. One of the most characteristic architectural features is epidermal lipping, also referred to as buttressing, in which the epidermis extends over the edges of the crater. The epithelial lobules are usually broad and well circumscribed, showing a pushing rather than infiltrative growth pattern. Keratinocytes commonly possess abundant eosinophilic "glassy" cytoplasm, reflecting a high degree of squamous differentiation. Together with the overall symmetry of the lesion, these features are considered helpful diagnostic clues favoring KA over invasive cSCC [1,5,21].

The histological appearance varies according to the stage of tumor development. In the proliferative phase,

marked acanthosis and epithelial hyperplasia are observed, accompanied by active keratinocyte proliferation and progressive formation of the characteristic crateriform architecture. As the lesion matures, keratinization becomes more pronounced, and the overall structure acquires the typical volcano-like configuration recognized clinically [1,3].

Cytological atypia in KA is usually mild or moderate. Mitotic figures may be present, particularly in the peripheral proliferative zones, and a mixed inflammatory infiltrate is frequently observed within the adjacent dermis. These findings should not be interpreted in isolation, as individual cytological features may overlap with those seen in cSCC. Instead, assessment of the overall architectural pattern remains essential for accurate diagnosis [1,5].

Distinguishing KA from well-differentiated cSCC represents the principal diagnostic challenge. Features that favor cSCC include irregular infiltrative growth, destruction of surrounding dermal structures, marked nuclear pleomorphism, atypical mitotic figures, perineural invasion, and loss of the characteristic symmetrical crateriform architecture. Nevertheless, some lesions display overlapping histological characteristics, and in certain cases a definitive distinction may be difficult even after thorough pathological examination [1,5,21].

Adequate tissue sampling is critical for reliable diagnosis. Superficial shave biopsies or limited specimens may fail to capture the overall architecture of the lesion, resulting in diagnostic uncertainty. For this reason, deep and representative biopsy samples that include both the central crater and peripheral margins are recommended whenever KA is suspected [2,5].

Immunohistochemical markers such as Ki-67, p53, p16, Bcl-2, and COX-2 have been investigated as potential adjunctive tools in the differential diagnosis between KA and cSCC. Although differences in expression patterns have been reported, considerable overlap exists, and no marker has demonstrated sufficient diagnostic accuracy to replace conventional histopathological assessment. Consequently, immunohistochemistry should be regarded as a supportive rather than definitive diagnostic method [1,8].

In clinical practice, the diagnosis of keratoacanthoma is best established through clinicopathological correlation. Integration of clinical presentation, dermoscopic findings, and histopathological features provides the most reliable approach for distinguishing KA from cSCC and for selecting the most appropriate therapeutic strategy [1,2,5].

Therefore, the diagnosis of KA should be considered a clinicopathological process rather than a purely microscopic diagnosis. Integration of clinical morphology, dermoscopy, and histology allows a more accurate assessment of biological behavior and supports appropriate treatment selection [1,2,5].

Individualized treatment strategy

The management of keratoacanthoma (KA) continues to generate discussion among dermatologists because the biological behavior of these tumors is not always predictable. Although spontaneous regression has been documented in some cases, it is impossible to determine with certainty which lesions will regress and which may continue to grow or exhibit features resembling cutaneous squamous cell carcinoma (cSCC). As a result, treatment decisions should not rely solely on the possibility of spontaneous involution but rather on a comprehensive assessment of clinical, dermoscopic, and histopathological findings [1,3,7].

The choice of treatment depends on multiple factors, including lesion size, anatomical location, growth rate, clinical appearance, patient age, associated comorbidities, cosmetic considerations, and the degree of diagnostic certainty. In routine clinical practice, management should be individualized, as no single therapeutic strategy is appropriate for all patients [3,5,8].

Surgical Treatment

Surgical excision remains the most widely accepted treatment option and is considered the preferred approach in many clinical settings. Its main advantage is that it provides both complete lesion removal and the opportunity for thorough histopathological evaluation. This is particularly important in cases where differentiation from well-differentiated cSCC remains uncertain despite clinical and dermoscopic examination [1,7].

Conventional excision is effective for most lesions and allows assessment of tumor margins as well as the depth and architectural characteristics of the lesion. Surgical treatment is generally preferred for rapidly enlarging tumors, recurrent lesions, atypical presentations, large keratoacanthomas, and tumors arising in locations where invasive carcinoma cannot be confidently excluded [1,5,7]. In anatomically sensitive areas such as the nose, eyelids, lips, ears, and digits, Mohs micrographic surgery may offer additional advantages. By allowing precise margin control while preserving healthy surrounding tissue, Mohs surgery can provide optimal functional and cosmetic outcomes in selected patients [7].

Intralesional Therapies

During recent years, increasing attention has been directed toward intralesional treatment modalities, particularly in patients for whom surgery may not be the most appropriate option. Intralesional methotrexate has demonstrated favorable results in numerous reports and has become one of the most frequently used conservative treatment approaches for selected cases of KA. Significant reduction in lesion size may occur after one or several injections, especially in elderly patients, individuals with multiple lesions, or patients with medical conditions that increase surgical risk [7,8].

Intralesional 5-fluorouracil (5-FU) has also been used successfully in the treatment of KA. By interfering with DNA synthesis in rapidly proliferating keratinocytes, 5-FU may induce gradual tumor regression while preserving surrounding tissue. This approach may be particularly useful when lesions are located in cosmetically sensitive areas or when surgical intervention would result in significant tissue loss [7,8,19].

Although the available evidence is largely based on case reports and small clinical series, both methotrexate and 5-FU have emerged as valuable therapeutic alternatives in carefully selected patients and represent important components of contemporary KA management [7,8].

Cryotherapy and Laser-Based Approaches

Cryotherapy remains a useful option for selected small and well-circumscribed lesions. Controlled tissue destruction by freezing may achieve satisfactory clinical outcomes while avoiding more invasive procedures. Nevertheless, because clinical and dermoscopic findings alone may not always distinguish KA from cSCC, histopathological confirmation should ideally be obtained before destructive treatment is undertaken [5,7].

Laser-based methods, particularly CO_2 laser ablation, have also been reported as effective in selected cases. Laser treatment may be considered for superficial lesions and for tumors located in areas where cosmetic outcome is an important concern. However, because laser ablation destroys tissue and may limit subsequent histopathological evaluation, careful patient selection remains essential [7,8].

Systemic Treatment

Systemic therapy is rarely required in patients with solitary keratoacanthoma but may play an important role in individuals with multiple eruptive lesions or inherited forms of the disease. Oral retinoids, particularly acitretin, have shown beneficial effects in reducing lesion burden and decreasing the development of new tumors. Such treatment may be especially useful in patients with Ferguson–Smith syndrome, generalized eruptive keratoacanthomas, and other rare forms characterized by multiple recurrent lesions [15–17].

Factors Influencing Treatment Selection

Selection of the most appropriate therapeutic approach begins with an accurate diagnosis and careful evaluation of the likelihood of cSCC. Clinical features such as rapid enlargement, ulceration, recurrence, tissue destruction, persistent growth, or histopathological findings suggestive of malignancy generally favor definitive surgical management [1,5,21].

On the other hand, conservative treatment approaches may be appropriate for selected patients with small lesions, multiple tumors, advanced age, significant comorbidities, or lesions located in anatomically and cosmetically sensitive regions. In these situations, treatment should balance oncological safety with preservation of function and appearance [3,7,8].

The clinical material presented in this review reflects the authors' clinical experience in the evaluation and management of patients with keratoacanthoma.

As dermatologists, our primary focus has been the accurate clinical and dermoscopic diagnosis of keratoacanthoma and the development of an individualized treatment strategy based on the specific characteristics of each lesion. Dermoscopy has become an integral part of our routine evaluation and frequently provides valuable information beyond that obtained by clinical examination alone. Particular attention is paid to lesion symmetry, crateriform architecture, central keratinization, white circles, white structureless areas, blood spots, and characteristic vascular patterns. Correlation of these findings with the clinical presentation often improves diagnostic confidence and facilitates differentiation between KA and other keratinizing tumors, especially well-differentiated cSCC [18,20].

The dermoscopic images presented in this study were obtained from patients evaluated in routine clinical practice and documented as part of the authors' clinical experience. In our experience, dermoscopy is especially valuable in atypical cases and frequently assists in selecting the most representative site for biopsy and histopathological evaluation [18,20].

Unlike surgical disciplines, our clinical approach has

primarily emphasized conservative and tissue-preserving management whenever such treatment could be applied safely. Intralesional methotrexate, intralesional 5-fluorouracil, cryotherapy, and other non-surgical modalities were frequently considered in patients with favorable clinicodermoscopic characteristics, particularly in elderly individuals, patients with significant comorbidities, and those with lesions located in cosmetically sensitive areas [7,8,19].

Surgical treatment was reserved mainly for lesions demonstrating rapid progression, recurrence, destructive growth, diagnostic uncertainty, or histopathological features raising suspicion for cSCC. In these circumstances, complete excision remained necessary both for therapeutic purposes and for definitive pathological assessment [1,5,7,21].

Our experience suggests that careful clinicodermoscopic evaluation allows more accurate treatment stratification and may reduce the need for unnecessary surgical procedures in selected patients. The combination of clinical examination, dermoscopy, and histopathological verification remains the cornerstone of effective management and supports a personalized approach to patients with keratoacanthoma [1,2,18,20].

DISCUSSION

Keratoacanthoma (KA) remains one of the most challenging keratinizing epithelial tumors encountered in dermatological practice because of its close clinical, dermoscopic, and histopathological relationship with cutaneous squamous cell carcinoma (cSCC). The findings from the current literature together with our clinical observations indicate that KA cannot always be regarded as a predictable self-limiting lesion. Although spontaneous regression is a well-recognized feature of KA, the clinical course may vary considerably, and some lesions may persist, continue to enlarge, or demonstrate characteristics overlapping with invasive cSCC [1,3,5].

The major diagnostic challenge in KA is the absence of a single clinical, dermoscopic, or histopathological criterion that can reliably distinguish it from well-differentiated cSCC in every patient. Both conditions may present with rapidly growing crateriform nodules, central keratinization, and inflammatory changes. Based on our review of the literature and our own clinical experience, the most reliable diagnostic approach is the integration of clinical morphology, dermoscopy, and histopathological examination rather than reliance on an isolated diagnostic feature [1,2,18].

Dermoscopy has become an important part of the diagnostic assessment of KA because it provides additional information regarding tumor architecture and surface characteristics that may not be clearly visible on routine examination. In our clinical observations, the most characteristic dermoscopic findings included a central keratin-filled area, white structureless zones, white circles, blood spots, and peripheral vascular patterns, including hairpin and irregular vessels. These findings reflected the typical crateriform organization of KA and helped identify lesions requiring biopsy and further evaluation [18,20].

The dermoscopic images included in this review were obtained from patients evaluated in routine dermatological practice and represent the range of dermoscopic patterns observed in keratoacanthoma. Our clinical observations are in agreement with previously described dermoscopic features of KA and highlight the practical importance of dermoscopy in daily diagnostic decision-making. In our experience, dermoscopic assessment contributed not only to improved diagnostic confidence but also to the selection of an appropriate biopsy site and the planning of individualized management strategies [18,20].

Histopathological examination remains essential because dermoscopic findings of KA may overlap with those observed in cSCC. The symmetrical crateriform architecture, central keratin-filled cavity, epidermal lipping, buttress-like epithelial proliferation, pushing borders, and well-differentiated keratinocytes with glassy eosinophilic cytoplasm represent characteristic features supporting the diagnosis of KA. In contrast, irregular infiltrative growth, destructive invasion, marked cytological atypia, abnormal mitotic activity, and perineural involvement should raise concern for cSCC. Our experience confirms that adequate biopsy sampling, including both the central and peripheral components of the lesion, is necessary for correct histopathological interpretation [1,5,21].

The therapeutic approach to KA is closely related to diagnostic certainty and assessment of the biological risk of each lesion. Although surgical excision remains the preferred treatment in many cases, particularly when cSCC cannot be excluded or when aggressive clinical features are present, treatment decisions should not be based only on tumor removal. In our practice as dermatologists, the choice of therapy is guided by the combination of clinical morphology, dermoscopic findings, histopathological results, lesion localization, and patient-related factors [1,7].

In selected patients, especially elderly individuals, patients with multiple lesions, or cases involving

cosmetically and functionally sensitive areas, non-surgical approaches may provide important advantages. Intralesional therapies such as methotrexate and 5-fluorouracil, together with other conservative methods, may achieve satisfactory clinical responses while reducing unnecessary tissue loss. However, these approaches should only be considered after appropriate diagnostic evaluation and should not replace histopathological confirmation in uncertain cases [7,8,19].

Our clinical observations suggest that KA should not be managed solely on the assumption that spontaneous regression will occur. A conservative strategy may be appropriate only after careful assessment of clinical behavior and dermoscopic characteristics. Conversely, lesions demonstrating rapid enlargement, recurrence, ulceration, destructive changes, or suspicious histological findings require active treatment to avoid delayed management of tumors with malignant potential [1,5,21].

The combination of dermoscopy and histopathology in our practice improved diagnostic accuracy and supported individualized treatment selection. This integrated approach allows clinicians to avoid unnecessary aggressive procedures in selected patients while maintaining appropriate oncological safety when cSCC remains a concern [1,2,18].

Future research should focus on identifying reliable molecular, genetic, and clinical predictors that may better define the biological behavior of KA and clarify its relationship with cSCC. Further refinement of dermoscopic criteria, development of advanced imaging techniques, and identification of molecular markers may contribute to improved risk stratification and more personalized therapeutic decisions [1,8].

Overall, our findings support the concept that KA requires careful clinical judgment and should not be considered either a uniformly benign or uniformly malignant lesion. A combined clinicodermoscopic and histopathological approach, together with individualized treatment planning, represents the most practical strategy for achieving accurate diagnosis and optimal patient management [1,2,18,20].

Limitations

This narrative review has several limitations that should be considered when interpreting the presented findings. The available literature on keratoacanthoma (KA) remains heterogeneous regarding diagnostic criteria, classification systems, and therapeutic approaches. The lack of universally accepted criteria that clearly separate KA from well-differentiated cutaneous squamous cell carcinoma (cSCC) continues to be a major challenge and limits direct comparison between published studies [1,5].

Another limitation is the variability of available clinical evidence. Many studies evaluating KA are based on retrospective analyses, case reports, or relatively small patient cohorts. The unpredictable clinical course of KA, including spontaneous regression in some patients and persistent or progressive behavior in others, makes it difficult to establish uniform treatment recommendations applicable to all clinical situations [3,7].

The diagnostic overlap between KA and cSCC represents an additional limitation. Although clinical examination, dermoscopy, and histopathological assessment have significantly improved diagnostic accuracy, some lesions continue to demonstrate overlapping characteristics. Dermoscopic findings such as central keratinization, white structureless areas, white circles, vascular patterns, and crateriform architecture may support the diagnosis of KA but cannot completely exclude cSCC without histological confirmation [1,18,20].

A further limitation concerns the interpretation of treatment outcomes. Since therapeutic decisions depend on lesion characteristics, anatomical localization, patient age, comorbidities, and clinician experience, comparison between different treatment modalities remains difficult. Prospective studies with standardized diagnostic criteria and long-term follow-up are required to better define the indications and effectiveness of surgical and non-surgical approaches [7,8].

Regarding our clinical experience, the presented observations reflect routine dermatological practice and the diagnostic experience of the authors in routine dermatological practice.

As with any clinical experience from a single medical center, the findings may be influenced by patient selection, referral patterns, and characteristics of the examined population. Nevertheless, the integration of clinical evaluation, dermoscopy, and histopathology provided valuable practical information for individualized KA management. Further multicenter studies with larger patient groups are needed to validate these observations and establish more precise diagnostic and therapeutic algorithms.

Future Perspectives and Conclusion

Future research should focus on improving the understanding of the biological relationship between keratoacanthoma and cutaneous squamous cell

carcinoma. Identification of reliable molecular and genetic markers may help predict lesion behavior and allow earlier differentiation between lesions with a self-limited course and those with malignant potential [1,8].

Further development of standardized dermoscopic criteria may improve the diagnostic pathway of KA. Our clinical experience suggests that dermoscopy serves as an important link between clinical examination and histopathology by allowing better evaluation of lesion architecture, keratinization patterns, and vascular structures. Future studies combining dermoscopic imaging with digital analysis may further improve diagnostic precision and reduce unnecessary invasive procedures.

From a therapeutic perspective, future investigations should aim to define clearer indications for different treatment strategies. While surgical excision remains an important option, particularly when cSCC cannot be excluded, minimally invasive approaches such as intralesional methotrexate, intralesional 5-fluorouracil, cryotherapy, and other tissue-preserving methods may become increasingly valuable in carefully selected patients, especially those with multiple lesions, increased surgical risk, or tumors located in cosmetically sensitive areas [7,8,19].

In conclusion, keratoacanthoma remains a challenging keratinizing epithelial tumor because of its rapid growth, variable biological behavior, and close relationship with cSCC. The findings from the literature together with our clinical and dermoscopic observations support the need for a comprehensive diagnostic strategy combining clinical examination, dermoscopy, and histopathological confirmation.

Our experience emphasizes that KA management should not follow a uniform approach but should be individualized according to lesion morphology, dermoscopic characteristics, histological findings, anatomical location, and patient-related factors. Careful clinicodermoscopic assessment combined with appropriate histological evaluation allows more reliable diagnosis and rational treatment selection while maintaining a balance between oncological safety and preservation of cosmetic and functional outcomes [1,2,18,20].

DECLARATIONS

Competing Interests

The authors declare no conflict of interest.

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Ethical Approval

Informed consent was obtained from all patients. Retrospective clinical case documentation was reviewed and approved in accordance with ethical standards.

REFERENCES

1. Bahmad HF, Stoyanov K, Mendez T, et al. Keratoacanthoma versus squamous cell carcinoma: histopathological features and molecular markers. *Dermatopathology*. 2024;11(4):272-285. doi:10.3390/dermatopathology11040029.
2. Zito PM, Scharf R. Keratoacanthoma. [Updated 2023 Aug 8]. In: *StatPearls [Internet]*. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK499931/
3. Tisack A, Fotouhi A, Fidai C, et al. A clinical and biological review of keratoacanthoma. *Br J Dermatol*. 2021;185(3):487-498. doi:10.1111/bjd.20389.
4. Efanova EN, Vasileva EA, Rusak YuE, Maksimova KYu. Giant keratoacanthoma of the skin in dermatovenerologist's practice. *Vestnik SurGU. Meditsina*. 2025;18(1):61-66. doi:10.35266/2949-3447-2025-1-7.
5. Yunusova EI, Yusupova LA, Garaeva ZSh, Mavlyutova GI. Keratoacanthoma: clinical presentation, diagnosis and therapy. *Far Eastern Medical Journal*. 2021;(2). Available from: https://cyberleninka.ru/article/n/keratoakantoma-klinika-diagnostika-terapiya.
6. Elder DE, Massi D, Scolyer RA, Willemze R, editors. *WHO Classification of Skin Tumours*. 4th ed. Lyon: International Agency for Research on Cancer; 2018. (WHO Classification of Tumours Series, Vol. 11).
7. Hoffpauir LA, William DJ, editors. Keratoacanthoma. [Updated 2025 Feb 25]. In: *Medscape [Internet]*. Available from: https://emedicine.medscape.com/article/1100471-overview
8. Dobre A, Nedelcu RI, Turcu G, et al. Multiple Keratoacanthomas Associated with Genetic Syndromes: Narrative Review and Proposal of a Diagnostic Algorithm. American Journal of Clinical Dermatology. 2025;26:45–59. doi:10.1007/s40257-024-00900-0.
9. Gantsev ShKh, Yusupov AS. Cutaneous squamous cell carcinoma. *Practical Oncology*. 2012;13(2):80-91.
10. Dzybova E, Vardanyan K, Vasilevskaya E. Squamous cell carcinoma of the skin: clinical presentation, diagnosis, treatment, and prevention. *Klinicheskaya Dermatologiya i Venerologiya*. 2015;14(4). doi:10.17116/klinderma20151444-14.
11. Galil-Ogly GA, Molochkov VA, Sergeev YuV. *Dermatooncology*. Moscow: Meditsina dlya vsekh; 2005. 870 p.

12. Lamotkin IA. *Clinical Dermatooncology: Atlas*. Moscow: BINOM; 2011. 499 p.
13. Zito G, Saotome I, Liu Z, et al. Spontaneous tumour regression in keratoacanthomas is driven by Wnt/retinoic acid signalling cross-talk. *Nat Commun*. 2014;5:3543. doi:10.1038/ncomms4543.
14. Wang Y, Zhao W, Zeng Y, et al. Multiple keratoacanthoma centrifugum marginatum: a case report and systematic review. *Transl Cancer Res*. 2018;7(6):1743-1747. doi:10.21037/tcr.2018.12.09.
15. Goudie DR, D'Alessandro M, Merriman B, et al. Multiple self-healing squamous epithelioma is caused by a disease-specific spectrum of mutations in TGFBR1. *Nat Genet*. 2011;43(4):365-369. doi:10.1038/ng.780.
16. El'kin VD, Mitriukovskii LS, Schastlivtseva LV, et al. Ferguson-Smith multiple familial keratoacanthoma: five cases in a single family. *Russian Journal of Clinical Dermatology and Venereology*. 2011;9(6):27-29.
17. Anzalone CL, Cohen PR. Generalized eruptive keratoacanthomas of Grzybowski. *Int J Dermatol*. 2014;53(2):131-136. doi:10.1111/ijd.12318.
18. Rosendahl C, Cameron A, Argenziano G, et al. Dermoscopy of squamous cell carcinoma and keratoacanthoma. *Arch Dermatol*. 2012;148(12):1386-1392. doi:10.1001/archdermatol.2012.2974.
19. Tran DC, Li S, Henry S, et al. An 18-year retrospective study on the outcomes of keratoacanthomas with different treatment modalities at a single academic centre. *Br J Dermatol*. 2017;177(6):1749-1751. doi:10.1111/bjd.15225.
20. Tandel JJ, Polra RV, Pillai D, Nair PA. Dermatoscopy of solitary keratoacanthoma. *Indian J Dermatol*. 2022;67(5):628. doi:10.4103/ijd.ijd_391_22.
21. Weedon DD, Malo J, Brooks D, Williamson R. Squamous cell carcinoma arising in keratoacanthoma: a neglected phenomenon in the elderly. *Am J Dermatopathol*. 2010;32(5):423-426. doi:10.1097/DAD.0b013e3181c4340a.