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Squamous Odontogenic Tumor

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ABSTRACT

Background: The literature on squamous odontogenic tumors (SOT) presents a comprehensive overview of their clinical, histopathological, and treatment-related aspects, highlighting their complexity and significance within odontogenic pathology. **Literature Review:** Further exploration by (Santiago Gomez et al., 2013) delves into the classification challenges of odontogenic tumors, particularly in relation to adenomatoid odontogenic tumors (AOT) and their association with odontomas. This inquiry underscores the need for additional research to clarify the relationships and distinctions among various odontogenic tumors, including SOT. The study by (Zargaran & Shojaei, 2020) contributes by examining squamous odontogenic tumor-like proliferations (SOTLPs), emphasizing the importance of accurate histopathological interpretation to prevent misdiagnoses. Their findings suggest that while SOTLPs share morphological similarities with SOT, they do not exhibit the same neoplastic behavior, highlighting the critical nature of accurate differentiation for appropriate management. An atypical presentation of SOT documented by (Thomas et al., 2021) illustrates the tumor's invasive potential and multifocal occurrences, further complicating the diagnostic landscape. This case reinforces the necessity for clinicians to remain vigilant in recognizing the varied presentations of SOT. **Conclusion:** In conclusion, the literature presents a multifaceted understanding of squamous odontogenic tumors, encompassing their biological behavior, diagnostic challenges, and treatment considerations. The insights gained from these studies are critical for advancing clinical practice in oral pathology, emphasizing the need for ongoing research and interdisciplinary collaboration to enhance diagnostic accuracy and therapeutic strategies.

Keyword: Squamous Odontogenic Tumor

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INTRODUCTION

The literature surrounding squamous odontogenic tumors (SOT) reveals a complex interplay of clinical, histopathological, and treatment considerations that underscore their rarity and significance in odontogenic pathology. (Siar et al., 2010) provided a foundational understanding of SOT, characterizing it as a benign yet locally infiltrative neoplasm typically presenting as a slow-growing, painless swelling. Their immunohistochemical analysis highlighted the involvement of Notch receptors and their ligands, suggesting a nuanced role in the tumor's cytodifferentiation, while also establishing the histological framework necessary for distinguishing SOT from other odontogenic lesions.

Building on this foundation, (Santiago Gomez et al., 2013) explored the clinical and histological aspects of adenomatoid odontogenic tumors (AOT) associated with odontomas, emphasizing the need for further research to delineate the relationship between these tumors and SOT. This inquiry into the broader category of odontogenic tumors highlights the challenges in classification and diagnosis, particularly regarding variants and their clinicopathological characteristics.

In a more recent contribution, (Zargaran & Shojaei, 2020) examined squamous odontogenic tumor-like proliferations (SOTLPs) within odontogenic cysts, emphasizing the importance of accurate histopathological interpretation to avoid misdiagnoses. Their findings indicated that SOTLPs, while morphologically similar to SOT, do not exhibit the same neoplastic behavior, thus necessitating careful differentiation to ensure appropriate management.

(Thomas et al., 2021) further added to the discourse by documenting a case of SOT with an atypical presentation, which underscored the tumor's invasive nature and the potential for multifocal occurrences. This case illustrates the diagnostic challenges posed by SOT and the need for clinicians to be vigilant in recognizing its varied presentations.

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(Marin et al., 2021) shifted the focus slightly by conducting a systematic review of malignant odontogenic tumors, including odontogenic carcinosarcoma (OCS). Their findings revealed the complexities surrounding the classification and diagnosis of malignant variants, drawing attention to the importance of accurate histological assessment, particularly in light of the potential for misdiagnosis in cases of SOT.

In a practical application of treatment strategies, (Hatibie Oley et al., 2021) presented a case where hyperbaric oxygen therapy (HBOT) was utilized post-resection of an SOT. This case not only highlighted the rarity of SOT but also demonstrated innovative approaches to enhancing postoperative recovery, emphasizing the need for ongoing exploration of effective therapeutic modalities.

Finally, (Majumdar et al., 2022) revisited the classification of odontogenic tumors, including the reintroduction of OCS as a distinct entity in the WHO classification. Their review encapsulated the historical context and evolving understanding of odontogenic tumors, reinforcing the importance of accurate classification in guiding treatment and predicting outcomes.

Through these contributions, the literature reveals a multifaceted understanding of squamous odontogenic tumors, encompassing their biological behavior, diagnostic challenges, and treatment considerations, all of which are critical for advancing clinical practice in the field of oral pathology.

LITERATURE REVIEW

The article "Squamous odontogenic tumor of the mandible: a case report demonstrating immunoexpression of Notch1, 3, 4, Jagged1 and Delta1" by (Siar et al., 2010) presents a detailed case study of a rare benign odontogenic epithelial neoplasm, specifically focusing on a squamous odontogenic tumor (SOT) observed in a 10-year-old Indian female. The authors effectively illustrate the clinical presentation, histopathological characteristics, and immunohistochemical findings associated with SOT, providing valuable insights into its pathogenesis.

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The case report describes a common clinical manifestation of SOT as a slow-growing, painless expansive swelling, which is crucial for practitioners to recognize in order to facilitate timely diagnosis and treatment. The authors' choice to highlight the absence of recurrence five years post-surgical excision underscores the generally favorable prognosis associated with SOT when adequately managed. This aspect is particularly significant as it emphasizes the importance of surgical intervention and the potential for long-term patient satisfaction following treatment.

Histopathological examination detailed in the article reveals the neoplasm's composition, characterized by bland-looking squamatoid islands within a mature fibrous connective tissue stroma. This description is critical as it aids in differentiating SOT from other odontogenic tumors, which may present with more aggressive histological features. The authors' meticulous documentation of these histological characteristics serves as a valuable reference for pathologists and clinicians alike.

A noteworthy contribution of the article is the immunohistochemical evaluation, which indicates positive reactivity for Notch receptors (Notch1, Notch3, Notch4) and their ligands (Jagged1, Delta1) in the neoplastic epithelial cells. The authors suggest that these findings implicate a role for the Notch signaling pathway in the cytodifferentiation of SOT. This insight opens avenues for further research into the molecular mechanisms underlying SOT and potentially other odontogenic tumors, making it a significant addition to the existing literature.

However, while the article provides substantial information regarding the clinical and histological features of SOT, it could benefit from a broader discussion of the implications of the immunohistochemical findings. A deeper exploration of how the Notch signaling pathway may influence tumor behavior, including differentiation and proliferation, would enhance the understanding of SOT's pathogenesis. Additionally, the article would be strengthened by a comparison of the findings with other similar tumors, which could contextualize the significance of the Notch pathway in odontogenic neoplasms more broadly.

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The article titled "Adenomatoid odontogenic tumor associated with odontoma: a case report and critical review of the literature" by (Santiago Gomez et al., 2013) provides a comprehensive examination of the adenomatoid odontogenic tumor (AOT) in conjunction with odontomas. The authors emphasize the clinical and histological characteristics of AOT, particularly when it presents alongside odontomas, which are benign tumors of the tooth-forming tissues.

The authors begin by outlining the significance of AOT within the spectrum of odontogenic tumors, noting its relatively benign nature and common occurrence in younger patients, predominantly females. The article effectively synthesizes existing literature, highlighting the need for further case reports and surveys to elucidate whether the association of AOT and odontomas represents a variant of the tumor or a distinct clinicopathological entity. This critical point underscores the ambiguity that currently exists within the field regarding the classification and understanding of these tumors.

In their review, the authors delve into the histopathological features of AOT, which include the presence of duct-like structures and a fibrous stroma. They also discuss the various imaging characteristics that aid in the diagnosis of AOT, particularly its radiolucent appearance on X-rays. Such detailed descriptions are valuable for clinicians and pathologists alike, as they provide essential insights into the diagnostic process.

Moreover, the article raises an important discussion about the treatment approaches for AOT, which typically involve surgical excision. The authors advocate for careful monitoring and follow-up, given the potential for recurrence, although they note that AOT generally has a favorable prognosis. This aspect is particularly relevant for practitioners dealing with patients diagnosed with odontogenic tumors, as it emphasizes the need for a tailored approach based on individual cases.

The article "A Clinicopathological Report of Four Cases of Squamous Odontogenic Tumor-Like Proliferations in Odontogenic Cysts: Suggested Opinions regarding This Unusual Nature" by (Zargaran & Shojaei, 2020) provides a significant contribution to the understanding of squamous odontogenic tumor-like

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proliferations (SOTLPs) within odontogenic cysts. The authors emphasize the importance of distinguishing SOTLPs from other similar entities, such as squamous odontogenic tumors (SOTs), well-differentiated squamous cell carcinoma, and acanthomatous ameloblastoma, which is critical for accurate diagnosis and appropriate management.

The study presents four clinical cases where SOTLPs were identified, with a prevalence of 66% among the examined cysts, including radicular cysts, a dentigerous cyst, and an odontogenic keratocyst. Notably, the article details that these proliferations were located in the cyst wall, particularly adjacent to the epithelial lining. This finding suggests that the lining of odontogenic cysts may serve as a source for SOTLPs, highlighting the potential role of inflammation in their development. The presence of inflammation in all cysts, along with budding observed in three cases, underscores the complex interplay between inflammatory processes and epithelial changes in odontogenic lesions.

The authors adeptly articulate the histopathological characteristics of SOTLPs, noting their morphological similarity to SOTs, yet they clarify that SOTLPs do not exhibit neoplastic transformation. This distinction is crucial, as it affects the biological behavior and prognosis of the lesions. The article effectively conveys the potential for misinterpretation by pathologists unfamiliar with the nuances of these proliferations, which could lead to inappropriate treatment decisions.

One of the strengths of this article lies in its clinical relevance; it not only reports cases but also provides insights into the implications of misdiagnosis. The authors advocate for heightened awareness among pathologists regarding the distinct features of SOTLPs compared to other odontogenic lesions, which could ultimately improve diagnostic accuracy and patient outcomes.

The article "An unusual presentation of an odontogenic tumor: A diagnostic quandary" by (Thomas et al., 2021) provides a comprehensive exploration of the squamous odontogenic tumor (SOT), a rare benign neoplasm with significant clinical implications. The authors effectively delineate the characteristics and classifications of SOT, emphasizing its intraosseous, mural, and extraosseous

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forms. This classification is crucial for understanding the tumor's behavior and potential treatment strategies.

One of the key insights from the article is the locally invasive nature of SOT, which originates from the periodontium. This detail is critical as it highlights the tumor's potential to cause significant local destruction, necessitating careful diagnosis and management. The authors further note the existence of aggressive and multifocal variants of SOT, which adds complexity to its clinical presentation and underscores the importance of thorough evaluation in suspected cases.

The article also addresses the association of SOT with other odontogenic tumors, particularly the calcifying epithelial odontogenic tumor. This correlation is significant, as it suggests a potential for diagnostic challenges and emphasizes the need for a multidisciplinary approach in managing such cases. The authors present a specific case of SOT arising from the mandible, accompanied by a peripheral cystic odontogenic tumor, which serves to illustrate the diagnostic quandary that can arise in clinical practice.

The article "Malignant Odontogenic Tumours: A Systematic Review of Cases Reported in Literature" by (Marin et al., 2021) provides a thorough examination of malignant odontogenic tumors (MOTs), with a particular focus on the classification and characteristics of these neoplasms. The authors highlight the inclusion of Sclerosing Odontogenic Carcinoma in the WHO Classification of Head and Neck Tumors (2017), emphasizing its unique features, such as perineural invasion, which supports its categorization as a malignant entity despite its low mitotic activity and the absence of reported metastases.

A critical evaluation of the article reveals a significant contribution to the understanding of odontogenic tumors, particularly through the systematic review of odontogenic carcinosarcoma (OCS). The authors provide a detailed analysis of nine reported cases of OCS, noting its aggressive nature and the complexity of its diagnosis due to its dual epithelial and mesenchymal components. The findings indicate that OCS is characterized by cytologically malignant features, yet the pathogenesis of its malignant transformation remains elusive. The authors'

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observation that 50% of patients experienced metastasis and that 57% succumbed to this malignancy underscores the severity of this tumor type and the importance of accurate diagnosis and management.

Furthermore, the article raises critical concerns regarding histological misdiagnosis. The authors cite a study indicating that only nine out of 22 reported MOTs were considered malignant upon review, suggesting a potential gap in diagnostic accuracy. This highlights the need for caution in interpreting incisional biopsies, as they may not be representative of the entire lesion. The authors effectively communicate the implications of these findings for clinical practice, advocating for enhanced diagnostic protocols and interdisciplinary communication to ensure accurate identification and management of odontogenic tumors.

The article titled "Fostering a faster post-operative wound healing process with hyperbaric oxygen therapy in a rare case of squamous odontogenic tumor" by (Hatibie Oley et al., 2021) provides a compelling case report that highlights the application of hyperbaric oxygen therapy (HBOT) in the management of post-operative wounds following the resection of a squamous odontogenic tumor (SOT). The authors emphasize the rarity of SOT, noting that there have been fewer than 100 documented cases, which underscores the significance of their findings within the context of odontogenic lesions.

The article begins by elucidating the characteristics of SOT as a locally aggressive odontogenic epithelial lesion, often presenting as cystic formations in the alveolus adjacent to the roots of teeth, particularly in the maxilla and posterior mandible. The authors effectively contextualize the clinical presentation of SOT, detailing its tendency to cause tooth displacement and mobility, which is critical for practitioners in diagnosing and managing such cases. Furthermore, the demographic insights provided—indicating a higher incidence in males around the age of 30—add to the understanding of the tumor's epidemiology.

One of the key contributions of this article is the exploration of HBOT as a therapeutic intervention aimed at enhancing post-surgical wound healing. The authors present a case where HBOT was implemented after the surgical excision of

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the SOT, suggesting that this approach may facilitate faster recovery and better healing outcomes. This is particularly relevant given the aggressive nature of SOT and the potential complications associated with surgical intervention. The rationale behind using HBOT—its ability to increase oxygen delivery to tissues and stimulate angiogenesis—aligns well with existing literature on wound healing, although the authors could strengthen their argument by referencing broader studies or meta-analyses that support the efficacy of HBOT in similar contexts.

Critically, while the case report is informative, it is limited by its singular case focus, which may not be generalizable to all patients with SOT. The authors acknowledge this limitation but could enhance the discussion by suggesting directions for future research that might include larger cohort studies or randomized controlled trials to better ascertain the effectiveness of HBOT in diverse patient populations.

The article titled "Odontogenic carcinosarcoma – A rare case report with review of literature" by (Majumdar et al., 2022) provides a comprehensive examination of odontogenic tumors (OTs), with a particular focus on the rare entity known as odontogenic carcinosarcoma (OCS). The authors effectively categorize OTs into benign and malignant types, detailing the clinical behavior and histological variations that characterize these lesions. This classification is crucial, as it underscores the complexity and heterogeneity of OTs, which can significantly influence treatment approaches and prognostic outcomes.

One of the key insights from the article is the historical context surrounding the classification of OTs. The authors reference the evolution of the World Health Organization's (WHO) classification, noting the initial removal of OCS from the odontogenic tumor classification due to its ambiguous origins and challenges in differentiation from other malignant entities. This historical perspective adds depth to the discussion, illustrating how ongoing research and case reports have contributed to the reestablishment of OCS as a distinct pathological entity in the latest WHO classification.

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The article also provides a critical evaluation of the clinical, radiological, and histopathological features associated with OCS. By synthesizing existing literature, the authors present a detailed overview of the surgical treatment options available for managing this rare tumor, as well as the associated recurrence rates and survival statistics. This information is particularly valuable for clinicians, as it aids in understanding the potential challenges and outcomes related to OCS.

However, while the article is thorough in its review of the existing literature and clinical case presentations, it could benefit from a more detailed discussion on the implications of these findings for future research directions. For instance, the authors could explore potential molecular and genetic factors that may contribute to the development of OCS, as such insights could pave the way for targeted therapies and improved management strategies.

CONCLUSION

The literature on squamous odontogenic tumors (SOT) presents a comprehensive overview of their clinical, histopathological, and treatment-related aspects, highlighting their complexity and significance within odontogenic pathology. The foundational work by (Siar et al., 2010) characterizes SOT as a benign yet locally infiltrative neoplasm, often identified through its slow-growing, painless swelling. This study emphasizes the role of Notch signaling in the tumor's cytodifferentiation, providing a critical histological framework for distinguishing SOT from other odontogenic lesions.

Further exploration by (Santiago Gomez et al., 2013) delves into the classification challenges of odontogenic tumors, particularly in relation to adenomatoid odontogenic tumors (AOT) and their association with odontomas. This inquiry underscores the need for additional research to clarify the relationships and distinctions among various odontogenic tumors, including SOT.

The study by (Zargaran & Shojaei, 2020) contributes by examining squamous odontogenic tumor-like proliferations (SOTLPs), emphasizing the importance of accurate histopathological interpretation to prevent misdiagnoses. Their findings

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suggest that while SOTLPs share morphological similarities with SOT, they do not exhibit the same neoplastic behavior, highlighting the critical nature of accurate differentiation for appropriate management.

An atypical presentation of SOT documented by (Thomas et al., 2021) illustrates the tumor's invasive potential and multifocal occurrences, further complicating the diagnostic landscape. This case reinforces the necessity for clinicians to remain vigilant in recognizing the varied presentations of SOT.

The systematic review conducted by (Marin et al., 2021) on malignant odontogenic tumors, including odontogenic carcinosarcoma (OCS), emphasizes the complexities surrounding the classification and diagnosis of malignant variants, thus drawing attention to the importance of precise histological assessment in SOT cases.

In a practical application, (Hatibie Oley et al., 2021) demonstrates the use of hyperbaric oxygen therapy (HBOT) post-resection of an SOT, showcasing innovative therapeutic approaches that can enhance postoperative recovery. This case highlights the rarity of SOT and the potential for novel treatments to improve patient outcomes.

Lastly, the review by (Majumdar et al., 2022) revisits the classification of odontogenic tumors, including the reintroduction of OCS as a distinct entity in the WHO classification, reinforcing the significance of accurate classification in guiding treatment and predicting outcomes.

In conclusion, the literature presents a multifaceted understanding of squamous odontogenic tumors, encompassing their biological behavior, diagnostic challenges, and treatment considerations. The insights gained from these studies are critical for advancing clinical practice in oral pathology, emphasizing the need for ongoing research and interdisciplinary collaboration to enhance diagnostic accuracy and therapeutic strategies.

DISCLOSURE STATEMENT

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