The use of audit in the diagnosis of oral Leishmaniasis

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Abstract:

Background: Oral Leishmaniasis is a new diagnostic challenge both globally and nationally. Once thought to be a part of mucocutaneous Leishmaniasis, oral Leishmaniasis can be defined as a distinct form of Leishmaniasis. It is yet to be included as an important and distinct differential diagnosis of ulcerative, ulceroproliferative and granulomatous disorders. It currently poses a diagnostic challenge for the dental practitioner where it is both misunderstood and confused with other diseases. If there is delayed treatment, it can cause severe disfigurement and other difficulties. This study utilises the benefits of audit systems in understanding and/or modifying an undesired trend within a medical departmental environment. We present the audit: ‘’Oral Leishmaniasis identification audit’’ in an attempt to improve the early diagnosis of oral Leishmaniasis by dental practitioners at National Ribat University Hospital.

Materials and methods: Three hundred questionnaires were distributed of which 267 were returned. These included undergraduate students (90), postgraduate students (37) and junior and senior dental practitioners (140). The 1st audit included 53 (27 males, 26 females) patients. Intervention was executed between the 1st and 2nd audit cycle to improve standards which consisted of a 3 months’ educational period. Thirty-four (17 males, 17 females) patients were included in the 2nd audit cycle. A review of change and recommendations for future improvements was undertaken.

Results: Pre- audit questionnaires returned by dental practitioners (140/267) in particular highlighted both poor undergraduate and postgraduate training standards for oral Leishmaniasis. Seventy- three percent of dental practitioners (102/140) had not learnt of oral Leishmaniasis previously or its oral manifestations. There was a significant improvement in the early diagnosis of oral Leishmaniasis between the 1st and 2nd audit cycles (P value < 0.05). The final audit cycle results showed a 33% rise in the early identification of oral Leishmaniasis.

Conclusion: The early identification of oral Leishmaniasis was significantly improved after the use of audit. Sixty-five percent of patients were diagnosed within 3 months of initial presentation in the 2nd audit compared to 32% in the 1st audit. Audit planning and implementation is a useful component in achieving optimum clinical standards. It has succeeded in improving the early diagnosis of oral Leishmaniasis at National Ribat University Hospital. Both practitioners and patients were upgraded in knowledge regarding Leishmaniasis in general and oral Leishmaniasis specifically in terms of diagnosis, prevention of spread and contraction and treatment.

Report:

Introduction:

Leishmaniasis dates back to the 7th century and remains the 2nd most prevalent parasitic infection in the world after malaria. It is transmitted either through anthropontic or zoonotic transmission[16]. It is a neglected tropical protozoal disease where there are over 12 million infected individuals with

Leishmaniasis worldwide and around 2 million new cases per year[2]. The infection is now increasing in both developing continents and in developed countries where migration and population changes (immunosuppression status) account for new cases of Leishmaniasis in America, Australia and Europe. The most common countries for contraction and endemic presence of Leishmaniasis remain geographically to be an areas such as India, East Africa (Sudan, Ethiopia, Algeria), Middle East (Saudi Arabia, Syria), Iran, and the South Americas (Peru, Brazil).

Leishmaniasis is caused by several species (over 20 species) the commonest being the L. donovanii species which is an endemic parasitological disease in North Sudan. Other causative species and types of Leishmaniasis include cutaneous (L. major, L. infantum and L. tropica), mucocutaneous (L. mexicana and L. braziliensis), and visceral including post kala-azar Leishmaniasis (L. donovanii, L. infantum and L. chagasi). Leishmaniasis co – infection with HIV is also an emerging issue and leads to untreatable complications.

It is unclear how specifically prevalent oral Leishmaniasis is in different parts of the world but in Sudan, new cases of oral Leishmaniasis (without the presence of a cutaneous lesion) is an increasing finding, albeit without epidemiological data. Literature on oral Leishmaniasis is scarce where reports include oral findings as part of mucocutaneous disease and not as a distinct entity. Oral Leishmaniasis is a distinct form of Leishmaniasis but resembles numerous disease conditions that can affect the head and neck region[(1-5)].

Manifestations of oral Leishmaniasis include single or multiple, unilateral or bilateral ulceration, erosions and sloughing of varying dimensions to the inner lips, ventral and dorsal tongue, gingival, buccal, hard and soft palatal mucosa as well as desquamation. Greyish bilateral lesions similar to secondary syphilis have been reported. Macrocheila, macroglossia, mucosal tags and proliferative lesions may also be clinical presentations of oral Leishmaniasis and thus present a granulomatous entity to the disease. Other features include glossitis and even osteomyelitis. Necrosis is a feature of long-standing ulceration and neck lymphadenopathy may also develop. Facially, maculopapular rashes, skin ulceration, blistering, necrosis and disfiguring granulomatous proliferations may arise. A butterfly-like rash with hypopigmentation may also develop. Figures (1-3) represent some of the clinical manifestations of oral Leishmaniasis presented to our clinic.

Histological examination using giemsa staining is utilised for diagnosis of oral Leishmaniasis and exhibits a dense diffuse lymphohistiocytic infiltrate, focal granulomas, increased plasma cells, foamy histiocytes and leishmania bodies[(6-8)]. The main treatment of oral Leishmaniasis particularly in Sudan includes the pentavalent antimonials (Sodium Stibogluconate [Pentostam] and Meglumine Antimoniate [(9-11)].

Scarce audits have been carried out in the literature regarding Leishmaniasis with no specific oral Leishmaniasis audits and/or its diagnostic standards in an institution. Currently, dental practitioners in National Ribat University Hospital, Sudan, rarely consider oral Leishmaniasis as a differential diagnosis amongst common oral disease presentations in oral medicine departments and have poor diagnostic skills for its early diagnosis. This audit is aimed at enhancing diagnostic skills of the dental practitioner and to promote awareness of its clinical presentation and its commonalities with other oral disease patterns.

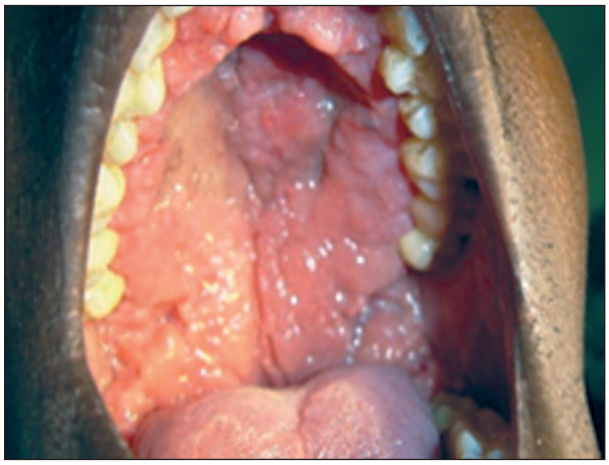

Figure 1:
Photograph of clinical manifestations of oral Leishmaniasis. Extensive bilateral exophytic granulomatous lesions on palate and posterior to upper anterior teeth.

Figure 2:
Photograph of clinical manifestations of oral Leishmaniasis. Profuse lower machrochelia with mucosal tearing and exfoliation, macroglossia with proliferative ulceration and glossitis.

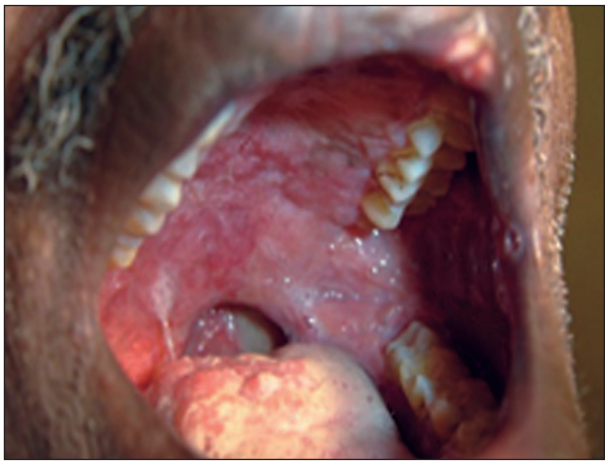

Figure 3:
Photograph of clinical manifestations of oral Leishmaniasis. Multiple nodular granulomatous right tongue lesions and palatal ulceroproliferations.

Materials & Methods:

A general insight of dental practitioners' knowledge of oral Leishmaniasis (its epidemiology in Sudan, clinical manifestations and differential diagnosis with other oral diseases) was assessed via a questionnaire distributed to four main dental hospitals in Khartoum. Three hundred questionnaires were distributed amongst undergraduate, postgraduate students and junior and senior dental practitioners of which 267 were returned. The aim of the 1st audit was to retrospectively analyse and layout our hypothesis: Late diagnosis of Oral Leishmaniasis is currently practised by dental practitioners at National Ribat University Hospital.

The first cycle of the audit was achieved retrospectively during a one-year period. One hundred and six patients with granulomatous, ulcerative and ulceroproliferative oral pathology were originally collected for audit analysis. Of those, 43 patients were confirmed through specific investigations to have diseases other than oral Leishmaniasis (tuberculosis n=20, Syphilis n=5, granulomatous conditions, Crohn's and orofacial granulomatosis n=18). Sixty-three patients were suspected to have oral Leishmaniasis. These were further investigated and also referred to the Institute of Endemic Diseases for further scrutiny.

Out of these 63 patients, 10 patients were found to have other types of Leishmaniasis. The remaining 53 patients (27 males, 26 females) were finally diagnosed as oral Leishmaniasis and were included in the 1st audit.

It was crucial to analyse the time relationship between initial presentation of patients with oral Leishmaniasis to the clinics and its final diagnosis by dental practitioners. Both 1st and 2nd audit cycle patients were assessed under three main groups: The early diagnosis of oral Leishmaniasis; those diagnosed within 3 months of initial presentation of the disease by our dental practitioners, intermediate diagnosis; those diagnosed between 3 – 6 months of initial presentation of the disease, and late diagnosis; those diagnosed after 6 months from initial presentation (Table 1).

Table 1. Assessment of oral Leishmaniasis diagnosis at National Ribat University Hospital.

Early diagnosis	Intermediate diagnosis	Late diagnosis – Type 1 & 2
From Initial presentation, the patient is diagnosed in less than 3 months	From Initial presentation, the patient is diagnosed between 3- 6 months	Type 1 – From Initial presentation, the patient is diagnosed after 6 months. Type 2 – (Regardless of time) 1. Patients with concomitant disease states affecting OL disease progression (HIV, immunosuppression's, etc.)

Intervention was implemented between the 1st and 2nd audit cycle and consisted of a 3 months' educational period, introducing methods for oral Leishmaniasis recognition, at practitioner level specifically and also patient level generally. Examples of the interaudit cycle intervention included a seminar entitled: ''How to identify oral Leishmaniasis and improve its diagnosis'', a three day higher postgraduate educational course was offered to all dental practitioners employed at National Ribat University Hospital. Posters were set around the clinic noting several key features of oral Leishmaniasis and an oral Leishmaniasis leaflet was designed and distributed to patients. The patient history sheet was modified to better assess those patients who may be at increased risk for contracting Leishmaniasis. Practitioners were encouraged to retrieve answers that were related to the patients' occupation (nature, location (rural/urban), hours spent outdoors (particularly at night), living conditions (state, village, tribal background, travel history), family history of illness and personal history including bites or history of previous disease. Finally, a new module was introduced at undergraduate level, 'Diseases endemic to Sudan' that included a well-developed insight on Leishmaniasis in general, including its oral presentations.

The aim of the 2nd audit was to assess the effect of this intervention. It was achieved over a period of 6 months. Sixty-one patients were initially collected for audit analysis regarding clinical manifestations of granulomatous, ulcerative and ulceroproliferative diseases.

Of those, 24 patients were confirmed through specific investigations to have diseases other than oral Leishmaniasis (tuberculosis n=12, syphilis n=1, granulomatous conditions, Crohn's and orofacial granulomatosis n=11). The remaining 37 patients were suspected, but not finally confirmed, to have oral Leishmaniasis. Further clinical examination and specific investigation proved that 3 patients had types of Leishmaniasis other than the oral type. Therefore, the remaining 34 patients (17 males, 17 females) were confirmed to have oral Leishmaniasis and were included in the 2nd audit cycle. The

complete audit period expanded from 2012 to 2014.

Results:

Pre- audit:

Three hundred questionnaires were distributed of which 267 were returned. These included undergraduate students (90), postgraduate students (37) and junior and senior dental practitioners (140). Questionnaires returned by dental practitioners (140/267) only were evaluated for the audit. They highlighted both poor undergraduate and postgraduate training standards for oral Leishmaniasis. Seventy-three percent of dental practitioners (102/140) had not learnt about oral Leishmaniasis previously or known of its oral manifestations. The input of differential diagnoses for oral Leishmaniasis was also not satisfactory; only (32/140) of dental practitioners knew of a reasonable list of differential diagnoses.

1st audit cycle:

Out of 53 patients, 17, 22 and 14 patients were diagnosed at early (less than 3 months), intermediate (3-6 months) and late stage (after 6 months) respectively with oral Leishmaniasis. This meant that only 17 patients were diagnosed with oral Leishmaniasis within 3 months of their initial presentation (32%). The incorrect diagnoses of oral Leishmaniasis was high in the 1st audit where out of 10 cases diagnosed provisionally as tuberculosis, only 2 were finally proved to be due to actual Tuberculosis.

2nd audit cycle:

Out of 34 patients, 22, 6, and 6 patients were diagnosed at early (less than 3 months), intermediate (3-6 months) and late stage (after 6 months) respectively. 22/34 patients were diagnosed with oral Leishmaniasis within the first 3 months of initial presentation (65%). This time, only 4 diagnoses of tuberculosis were provisionally applied instead of oral Leishmaniasis; 1 of which was finally confirmed as tuberculosis. We highlight a significant improvement in the early diagnosis of oral Leishmaniasis between the 1st and 2nd audit cycles (P value < 0.05).

Discussion:

Leishmaniasis-based audits in the literature are scarce and usually focus on types other than oral Leishmaniasis. An audit on oral Leishmaniasis and/or the focus on a diagnostic challenge based audit such as this one has not been previously conducted[1718]. Reports on Leishmaniasis in the literature credit the importance to strengthen further studies and advancements on epidemiology, diagnosis, prevention and treatment of Leishmaniasis, particularly visceral and cutaneous Leishmaniasis[16]. However, there are no global reports that focus on oral Leishmaniasis as a distinct type of Leishmaniasis, or the importance of improving its early detection.

It would be prudent to publish new and exclusive information on oral Leishmaniasis from different regions around the world including Sudan. It is also crucial that the differential diagnoses pertaining to ulcerative, ulceroproliferative and granulomatous disorders in particular, should always include oral Leishmaniasis including worldwide medical textbooks. These include, but are not limited to, vesicullobullous disorders, granulomatous disorders, autoimmune disorders, malignancies, vasculitis disorders, deep-seated infections, immune deficiencies, drug reactions and trauma.

An audit protocol consists of identifying ideal standards, collecting data on the current clinical practice and comparing this to the ideal standard, planning and implementing necessary change and re- audit after a suitable time period to assess success or failure. This audit managed the opportunity for staff education where the delivery of education promoted the accurate diagnosis and management of oral Leishmaniasis between the 1st and 2nd audit cycles. Other benefits of audit systems include reducing clinical errors, identifying strengths and weaknesses in an overall professional community, and encouraging change within that community that is consistent and similar throughout[12 -14].

“The oral Leishmaniasis identification audit” is a clinical audit that critically analyses a discrepancy in optimum standard of care – ‘Late diagnosis of

Oral Leishmaniasis'. This study aimed at firstly assessing the degree of knowledge amongst dental practitioners regarding oral Leishmaniasis. It was found that dental practitioners did not have enough skills and/or knowledge to diagnose effectively and early, oral Leishmaniasis at National Ribat University Hospital. Only 32% of patients with oral Leishmaniasis were diagnosed within 3 months of initial presentation in the 1st audit compared to 65% in the 2nd audit cycle. Oral Leishmaniasis was also more correctly diagnosed in the 2nd audit compared to the 1st audit and was included in the primary differential diagnosis in the 2nd audit more than the 1st. Also, of importance, less incorrect diagnosis of other diseases was carried out in the 2nd audit (8 incorrect diagnoses of tuberculosis compared to 3 incorrect diagnoses between the 1st and 2nd audit respectively).

The audit focused on trying to improve the early diagnosis of oral Leishmaniasis by intervention. To analyse the results of this intervention, a reassessment was undertaken at the 2nd audit. There was a 33% rise in the early identification of oral Leishmaniasis between the 1st and 2nd audit cycles. (Table 1) was the method of audit reproducibility and can also be used for assessment of other diseases and their standards of diagnosis. It is important to note that within (table 1), a late type 2 stage was introduced. This was to prevent bias in difficult diagnosis (where lesions look atypical) in those patients with other immunosuppressive diseases and oral Leishmaniasis complicating the clinical scenario. It highlights that those patients with oral Leishmaniasis as well as severe co-morbidities would not be suitable to be aligned in any of the three major groups mentioned and should be accounted for in isolation. After completion of the 2nd audit, a review of the audit process results and recommendations were put in place to determine a strong future plan aimed at improving the clinical diagnosis of oral Leishmaniasis.

The effective and early diagnosis of oral Leishmaniasis at local level (National Ribat University Hospital) requires the continuous up-dating and transfer of knowledge as well as up-keep of departments in surveillance of standards (re-audit). At a national level, it is necessary to develop a national identification strategy that aims to understand and alleviate the common causes of late diagnosis and its management on a national scale (necessary training, investigative methods and treatment should be provided). It is also mandatory to provide more community and patient-based campaigns to prevent the diseases' spread and promote impoverished people to understand the importance of early presentation and investigations of lesion including oral lesions.

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