A RETROSPECTIVE STUDY OF LUDWIG'S ANGINA AT THE MAXILLOFACIAL UNIT OF THE KOMFO ANOKYE TEACHING HOSPITAL-KUMASI, GHANA.

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ABSTRACT

Introduction: Ludwig's angina is a potentially life-threatening diffuse cellulitis involving the sublingual, submental, and submandibular spaces bilaterally and causing progressive airway obstruction. The microbiology of Ludwig's angina is polymicrobial, but commonly isolated is Streptococcal spp.

Aim: The current study aimed to retrospectively evaluate the prevalence of Ludwig's angina at the Maxillofacial Unit of the Komfo Anokye Teaching Hospital, Ghana.

Materials & Methods: A 2-year retrospective analysis of patient records from January 2012 to December 2013 was undertaken. The studied variables included the aetiology, symptoms, signs, and treatment modalities. Descriptive analysis was done using charts, frequency, and tables.

Results: The total number of admissions for maxillofacial space infections was 224, comprising 128 males and 96 females. The number of patients with Ludwig's angina was 56, giving a prevalence rate of 25.0%. The commonest source of infection was of odontogenic origin (94.6%), and the teeth most involved were the first lower molars (37.5%). The predominant microorganisms isolated were E.coli, Klebsiella, and Pseudomonas spp. The majority of patients (94%) were managed medically and surgically with incision, drainage, and insertion of drains as well as extraction of affected teeth. The commonest antibiotic combination was amoxicillin/clavulanate potassium with metronidazole (65.5%), followed by crystalline penicillin with metronidazole (12.7%).

Conclusion: The commonest cause of Ludwig's angina was odontogenic, and the microorganisms cultured were E. coli, Klebsiella, and Pseudomonas. The commonest antibiotic combination used for treatment was amoxicillin/clavulanate potassium with metronidazole.

INTRODUCTION

Ludwig's angina is a serious, potentially life-threatening fascial space infection of the neck and the floor of the mouth. Originally described by Wilhelm Frederick von Ludwig in 1836[1], this condition is notorious for its aggressiveness, rapid progression to airway compromise, and high mortality when not treated promptly[2-5]. The bacteriology of Ludwig's angina is polymicrobial and predominantly involves the oral flora. The organisms most often isolated in patients with the disorder are Streptococcus viridians and Staphylococcus aureus. Anaerobic bacteria also are frequently involved[6,7].

As the infection progresses, oedema of the suprahyoid tissues and supraglottic larynx elevates and posteriorly displaces the tongue, resulting in life-threatening airway narrowing. Clinical features include swelling and pain in the mouth and anterior neck floor, fever, dysphagia, odynophagia, drooling, trismus, toothache, and fetid breath. The patient may also present with hoarseness, stridor, respiratory distress, decreased air movement, and cyanosis. In extreme cases, the patient will likely present with a "sniffing" position. This is the characteristic posture assumed by patients with impending upper airway compromise consisting of an upright posture with the neck thrust forward and the chin elevated. Patients may exhibit dysphonia. They may have a muffled tone at higher registers (a "hot potato" voice) caused by oedema of the vocal apparatus. This finding should be a warning to clinicians of potentially severe airway compromise[7,8]. On oral examination, there is elevation of the tongue, brawny indurations of the floor of the mouth and anterior neck, and non-fluctuant suprahyoid swelling typify the disease process. There is typically bilateral submandibular oedema, with marked tenderness on palpation and, occasionally, subcutaneous emphysema. The swelling of the anterior soft tissues of the neck above the hyoid bone sometimes leads to the characteristic "bull's neck" appearance of affected patients. Lymphadenopathy and fluctuance are not usually seen in patients with Ludwig's angina[8]. Once the airway is secured, aggressive intravenous administration of antibiotic agents should begin. Initial treatment is targeted at Gram-positive organisms and anaerobes in the oral cavity. Administration of several antibiotic agents has been proposed, including high-dose penicillin G plus metronidazole or clindamycin with ciprofloxacin, amoxicillin-clavulanate, and ticarcillin-clavulanate. Although controversial, using dexamethasone to decrease oedema and improve antibiotic penetration has received some support[9]. Surgical drainage is indicated when there is suppurative infection, clinical fluctuance, crepitus, or a purulent needle aspirate. Removal of infected teeth is also essential to complete the drainage process. The prognosis of Ludwig's angina depends primarily on immediate protection of the airway and then on prompt antibiotic and possibly surgical treatment of the infection.

MATERIALS AND METHODS

A retrospective study of patients admitted and diagnosed with Ludwig's angina over a twenty-four-month period from January 2012 to December 2013 inclusive was conducted. The files of patients served as our primary source of data for the study characteristics of interest. The population of interest was strictly all patients diagnosed with Ludwig's angina at the Maxillofacial Unit of the Komfo

Anokye Teaching Hospital, Ghana. A special data collection form was designed and used to extract data from patient folders by the authors of this study. The extracted data were entered into a database in Epi-Info version 3.1.5 software and analysed using STATA/MP 13.0. Descriptive statistics determining percentages for categorical variables and summaries for continuous variables were done. The results were presented in the form of tables and charts. Further comparison of some variables was determined in terms of percentages to assess the relationship between those variables.

RESULTS

The prevalence rate of Ludwig's angina in this study was 56, 25.0%. At the time of presenting to KATH, most patients had swelling and dysphagia (60.2%), 19.3% had swelling, trismus, and dysphagia, 15.50% had only swelling, and 5.0% had swelling with dyspnoea. The majority of patients had samples taken for culture and sensitivity tests (64.3%). The culture and sensitivity results from the laboratory samples showed that in 91.7%, there was no bacterial growth, while there were equal proportions of E. coli, Klebsiella, and Pseudomonas (2.8%). The majority of patients (94.0%) were managed medically and surgically with incision, drainage, and insertion of drains as well as extraction of affected teeth. About 4.0% also had excision of necrotic tissue done, while a few (2.0%) had either tooth extraction only or with debridement. No patient had a tracheostomy done. The majority of the patients (44.6%) spent an average of 8 days on admission. The patients' age distribution showed that most were in the 21 – 30 age group (30.4%), 31 – 40 age group 25.0%, above 50 years 21.4%, and 41 – 50 age group 14.3%. The median age was 36.5(25.5 -47.5) and the mean age was 38.4(17.2)

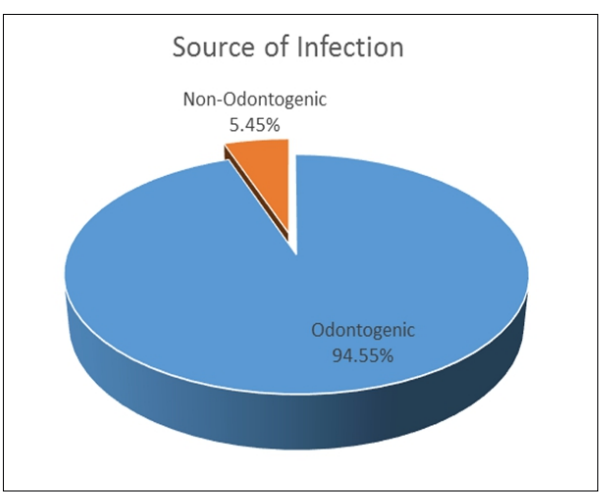

Figure 1: Odontogenic versus non-odontogenic sources of infection

The total number of patients admitted with maxillofacial space infections (MFSI) was 224, comprising 128(57%) males and 96(43%) females.
Out of the total number of patients' with Ludwig's angina at KATH, 33(58.9%) were males and 23(41.1%). Giving a female: male of 1: 1.4. Statistical significance level was set at 0.05

Table 1: Primary source of infection

Primary source of infection (n=56)	Number	Percentage (%)
Lower first molar	21	37.5
Lower second molar	9	16.1
Lower third molar	20	35.7
Unidentified	3	5.3
Throat/Tonsil	3	5.4
Total	56	100.0

The lower molar teeth accounted for all the odontogenic sources of infection, with the majority coming from the first molar (37.5%), the third molar (35.7%), and the second molar (16.1%).

Table 2: Duration of symptoms before presenting to KATH

Period of delay (Days)	Number of patients	Percentage (%)
1-5	5	8.9
6-10	40	71.4
11-15	7	12.5
>15	4	7.2
Total	56	100.0

The majority of patients delayed for 6 to 10 days before visiting the hospital (71.4%)

Table 3: Antibiotics used in the management of Ludwig's angina at KATH

Drug Therapy, N=55	Number	Percentage (%)
Amoxicillin/clavulanate potassium, Ciprofloxacin, Metronidazole	3	5.5
Amoxicillin/clavulanate potassium, metronidazole	36	65.5
Amoxicillin/clavulanate potassium, Metronidazole, Clindamycin	2	3.6
Ceftriaxone sodium	1	1.8
Ceftriaxone, Metronidazole	3	5.5
Ciprofloxacin, Clindamycin	3	5.5
Crystalline Penicillin, Metronidazole	7	12.6
Total	55	100.0

Combination antibiotic drug therapy was used in almost all cases. The most frequent combination used was Amoxicillin/clavulanate potassium with metronidazole, accounting for 65.5% of antibiotic drug therapy.

DISCUSSION

There is variation in the prevalence of Ludwig's angina worldwide. Most studies ranged from 5.5%[10], 13.0%[11], 28.0%[12], 36.6%[13], and 37.0%[14]. However, in this study, the two-year study's prevalence rate was 25.0%. This current prevalence may be attributed to poor public education on the part of health professionals or a lack of the requisite trained health professionals to give treatment before the condition deteriorates.

In most studies, odontogenic infections were the commonest cause of Ludwig's angina[13,15,16,17]. In this study, of the odontogenic causes, the majority of cases originated from the lower first molars (37.5%), followed by the lower third molars (35.7%) and lastly by the second lower molars (16.7%). This differs from other data that suggest that the second and third molars are most involved in Ludwig's angina because their roots were beyond the mylohyoid muscle[13,18]. This may be because the lower first molars erupt earlier than the other molars and are subjected more to cariogenic factors of the oral environment than the other molars[19], and although their roots are above the mylohyoid muscle infection easily spreads via the fascial plane to the submandibular and submental regions.

The clinical presentation of Ludwig's angina in other studies[15,19] is similar to this current study. In this present study, the majority of patients on presentation to our hospital had bilateral tense submandibular swelling with pain and either dysphagia, trismus, or dyspnoea. For instance, about two-thirds presented with swelling and dysphagia, and nearly one-fifth had swelling with trismus and dysphagia. The majority of the patients had been having toothache before the onset of swelling and present 6-10 days after the onset of toothache, while 12.8% had delayed or self-medicated for 11-15 days before vising the hospital and 7.1% had waited for more than 15 days from onset of the toothache before visiting the hospital. This indicates that most patients do not present for medical care until they are in severe pain or have visited herbal centres for treatment to no avail. The majority of patients are, therefore likely to present to the medical facility for care when the infection is advanced.

The microbiology of Ludwig's angina is polymicrobial and the commonest infecting organisms are from the oral flora with predominance of Streptococci, Staphylococci, Bacteroides and Fusobacterium spp. Other microorganisms such as Haemophilus influenza, Pasteurella and Enterobacteriaceae have also been detected[16,20]. In this present study, out of the 56 patients treated with Ludwig's angina only 64.5% had serosanguinous fluid aspirated for culture and sensitivity. Most (91.7%) of the samples had no growth at all, with limited growth of E. coli, Pseudomonas, and Klebsiella. This may be as a result of self-medication. Also, most patients were referred from other hospitals where they received some form of treatment, including antibiotic therapy, before referral.

Early diagnosis and prompt management of Ludwig's angina cannot be over-emphasized. Securing the airway in those with airway compromise is the first priority. There is controversy regarding the best way to manage the airway of patients with Ludwig's angina. Options range from conservative management involving close observation and intravenous antibiotics to airway intervention, including tracheostomy and endotracheal intubation using fibre-optic nasendoscopy. Airway management of Ludwig's angina patients at our hospital is mostly conservative. Most patients are started on steroids immediately and this is usually maintained for at least 48 hours. In this study the majority of patients with airway obstruction were given 12mg intravenous dexamethasone stat, then 4mg 8 hourly over 48 hours. This was done together with high dose intravenous antibiotic coverage. This successfully reduced inflammation, thus reducing airway obstruction. Early surgical and medical intervention has been emphasized in several studies[21,22].

None of the patients had tracheostomy done for airway management; the majority of patients had surgical incision and drainage, and extraction of infected teeth (94.0%), whilst 2.0% had only medical management. Those who developed complications like necrotizing cervical fasciitis had necrotomy and debridement done. All the patients received aggressive intravenous antibiotics.

CONCLUSION

Ludwig's angina has a prevalence rate of 25.00% at KATH, and affects mostly males over the age of 30 years. The commonest source of infection was odontogenic, with the first and third lower molars mostly involved. The majority of patients were managed medically and surgically. The surgical management involved extraction, incision and drainage, and insertion of drains.

RECOMMENDATIONS

The Ghana Health Service should provide the needed resources to enable oral health practitioners to carry out more educational programs. Moreover, dental and medical officers should be given continuous professional education on early diagnosing and managing Ludwig's angina. This will go a long way to reduce the incidence of Ludwig's angina.

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