

## Aetiology of Ludwig's Angina: A Hospital Based Study

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### Abstract

**Introduction:** Ludwig's angina is potentially life-threatening spreading cellulites of neck with high level of morbidity and mortality. Dental caries and diabetes mellitus are most common aetiological factor for Ludwig's angina. Bad oral hygiene and poor socioeconomic condition are also responsible for this grave disease. This disease was frequently fatal; mortality rates for Ludwig's angina exceeded 50% in the pre antibiotic era; however, antibiotics and aggressive surgical intervention have significantly reduced mortality recent series quote mortalities of 0-10%.

**Objectives:** To find out the aetiology of patient's of Ludwig's angina.

**Materials and Methods:** This cross sectional descriptive study was conducted among 89 patients admitted in the Department of ENT and Head-Neck Surgery in Dhaka Medical College Hospital from 01.07.2010 to 30.06.2012. Patients were selected by specified inclusion and exclusion criteria. Data were collected in a structured questionnaire and analysed by SPSS 16.0 for Windows.

**Results:** Among 89 patients about 69% were from rural area and 55% from poor socio-economic class. Sixty-four patients (74.2%) suffered from dental caries and 15.7% were diabetic.

**Conclusion:** Study shows some factors like dental caries, bad oral hygiene, oral mucosal infections, diabetes mellitus were associated with Ludwig's angina, which may be preventable and curable by early diagnosis and intervention. The public awareness regarding aetiology of Ludwig's angina may contribute great role in reduction of this disease prevalence.

**Key-word:** Ludwig's angina, Dental caries, Diabetes mellitus, Oral hygiene.

### Introduction

Ludwig's angina is a serious, potentially life-threatening spreading cellulitis<sup>1</sup> of the tissues of the floor of the month extending into sublingual, submental and submaxillary spaces,<sup>2,3,4,5</sup> usually occurring in adults with concomitant dental infections. It is named after the German physician, Wilhelm Friedrich von Ludwig who first described this condition<sup>6,7</sup> in 1836. Even today it is the most commonly encountered neck space infection which represents 13% all deep neck abscesses<sup>8</sup>. Ludwig's angina is odontogenic in origin in up to 90% of case<sup>4,5</sup>, although oral lacerations<sup>6,7</sup>, mandible fractures and infection of an oral malignancy have also

been implicated<sup>8</sup>. Recent infections or extractions of the second or third mandibular molars are the most common aetiologies, as the roots of these teeth extend inferiorly below the mylohyoid line of the mandible, providing a route of extension to the submaxillary space<sup>8</sup>. One recent review reporting the incidence of various illnesses associated with Ludwig's angina found 18% of cases involved diabetes mellitus, 9% AIDS and another 5% were HIV positive<sup>8</sup>.

Like other developing country, the people of Bangladesh has poor nutritional status, bad oral hygiene, unjustified use of antibiotic by rural medical practitioner, lack of proper medical support and negligence of referral system lead such type of patient of Ludwig's angina to a great problem. As the most common causes are preventable and, early identifiable, clinical condition is manageable and the morbidity and mortality is controllable, the importance of this medical entity should be considered. To find out the aetiology of patient of Ludwig's angina this study was conducted.

### Materials and Methods

To observe aetiological factors of patient of Ludwig's angina admitted in the Department of ENT and Head-Neck Surgery in Dhaka Medical College Hospital this cross sectional study was done among 89 patients from 01.07.2010 to 30.06.2012. Patient who was referred or came individually into the outdoor patient department and admitted into the hospital fulfils the inclusion criteria of this study. Patient with other neck swelling like other neck space abscess, lymphangioma, angioneurotic oedema, submandibular gland neoplasms, infected plangingrenula, thyroglossal cyst, cystic hygroma, lymphoma, submandibular haematoma etc. were excluded. Data was collected in structured questionnaire and clinical examination with certain investigation like radiological support and culture and sensitivity test. Data were processed manually and analysed with the help of SPSS 16.0 for windows. Qualitative data were presented as frequency and percentage.

### Results

To observe aetiological factors patient of Ludwig's angina, during the period of this study, 89 patients of Ludwig's angina out of 6046 patients got admitted in Dhaka Medical College Hospital, the prevalence of Ludwig's angina was 1.47%. During the study period we found male preponderance with sporadic

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to children. In this study patients of 5th decade 24(27.0%) were mostly sufferer of Ludwig's angina. Next was 6th decade and above 23(25.8%). The patient of 3rd and 4th decade shared equal number 13(14.6%). Among study sample 62 (69.4%) resided at rural area and 49 (55.0%) patients were from poor socioeconomic class. Regarding their occupation, the agriculture and businessman shared the equal number 16(18.0%). The daily labour was 9(10.1%). The service holder and industrial worker shared equal number 4(4.5%) and others shared maximum number 34(38.2%) (Figure-1). In the tooth cleaning habit 65(73%) patients were used to clean their tooth by tooth brush with paste. Fourteen (18.0%) used ash as their tooth cleaning purpose. Meshwak was used by 7(7.9%) patients. Regarding personal habit 32 patients (36.0%) were smoker, 13(14.6%) were tobacco chewer and 9(10.1%) were both smoker and tobacco chewer. One (1.1%) was substance user. None of them disclosed their alcoholic habit (Table-I).

There were 15 patients (16.8%) who developed Ludwig's angina following tooth extraction. Sixty-four (71.9%) patients presented with dental problems followed by diabetes mellitus (15.7%), Laceration in oral mucosa and tonsillar infections (11.1%). Fourteen patients (15.7%) of Diabetes mellitus had associated dental infection. Fifteen patients (16.8%) developed Ludwig's angina following tooth extraction. Among the dental caries 41(46%) patients were suffered from single caries and 16(18.0%) and 7(7.8%) were suffered from double and multiple caries tooth respectively (Table-II)

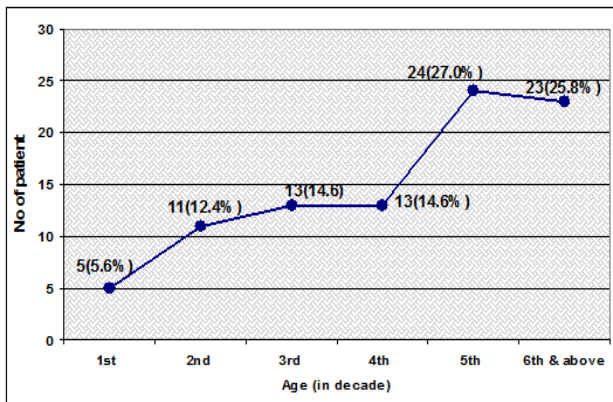


Figure-1: Distribution of Ludwig's angina by age (n=89)

Table-I: Tooth cleaning and smoking habits of the patient (n=89)

	Variables	Frequency	Percentage
Tooth cleaning habits	Ash	16	18.0
	Meshwak	7	7.9
	Tooth brush with paste	65	73.0
	Tooth powder	1	1.1
Personal habits	Smoking	32	36.0
	Tobacco chewing	13	14.6
	Substance abuse	1	1.1
	Both smoking & tobacco chewing	9	10.1
	None	34	38.2

Table-II: Risk factors of Ludwig's angina (n=89)

	Variables	Frequency	Percentage
Risk factors	Dental caries	64	71.9
	Diabetes mellitus	14	15.7
	Laceration in oral mucosa and tonsillar infections	10	11.1
	H/O tooth extractions	15	16.8
	Others	1	1.1
Dental caries	Single caries tooth	41	46.1
	Two caries teeth	16	18.0
	Multiple caries teeth	7	7.9
	No caries tooth	25	28.1

Discussion

While described as far back as the writings of Hippocrates and Galen, the necrotizing fasciitis Ludwig's angina was first detailed by the German surgeon Wilhelm Friedrich von Ludwig<sup>9</sup> in 1836. Ludwig's angina originates from recently extracted or infected tooth of lower second and third molars<sup>10</sup>. In this study we found that the patient having dental caries was more frequent than the non-dental causes. Ludwig's angina is a rare condition and this has been ascribed to the introduction of antibiotics several years ago<sup>2</sup> and improved standards in dental practice<sup>11</sup>. This may also be responsible for the number seen during the period of the study. There is no consensus of opinion from previous investigations on the demographic pattern of Ludwig's angina probably because of its uncommon occurrence and the fact that majority of studies were case reports<sup>12,13</sup>. However, our findings are consistent with earlier reports showing male adults preponderance with sporadic incidents in children<sup>11,12,14</sup>. Here male to female ratio was 4:56:1, which was nearly consistent to the previous studies in our country as 2:57:1 by Fakir et al<sup>15</sup> and 2:16:1 by Hanif et al<sup>16</sup>. No age is immune from Ludwig's angina. The disease was found among the people of as younger of 4 months as older 79 years of old (mean 37.94±SD 16.31). The average age is nearly consistent with Wang LF<sup>17</sup> who found it to be 21.7 years and mean, 45.5 years by Fakir et al<sup>15</sup> and 33 years by Hanif et al<sup>16</sup>.

Ludwig's angina can arise from various sources such as odontogenic infection<sup>2</sup> or complicated cases of submandibular<sup>3</sup> gland sialadenitis and sialolithiasis, tongue base lymphangioma, and tongue piercing<sup>12,15,17</sup>, but several studies report our finding that there is usually a dental focus of infection<sup>2,14</sup>. We found 64(74.2%) patients were suffered from dental carious which simulated of the previous study by Fakir et al<sup>15</sup>. that was 70% and 66% by Hanif et al<sup>16</sup>. Details of the pathway of spread have been well decorated<sup>11,18</sup>. In previous reports the role of underlying disease, particularly diabetes mellitus in the aetiopathogenesis of severe orofacial infections was highlighted<sup>19</sup>. Despite the fact that underlying systematic disease mainly diabetes mellitus and chronic renal failure was elicited in some of our cases (15/89), the literature is inconclusive as to whether systemic illness predisposes to Ludwig's angina. While sickle cell anaemia, chronic alcoholism and pulmonary infection were reported by Oduanya SA<sup>20</sup> and Hought et al<sup>18</sup>. We have found single patient (1.1%) who disclosed himself as a substance user. The morbidity

and mortality of that patient was hundred percentages. However, what appears certain is that such patients are monitored, as they are readily susceptible to life-threatening immune-compromised and should be thoroughly evaluated the complication.

## Conclusion

Eighty-nine patients of Ludwig's angina were included in this study. Patients of all age, sex and social status were included. This study had been carried out in limited number cases in a limited period of time. The results of this study give significance to reflecting certain facts regarding Ludwig's angina. Study showed some factors associated with this disease which may preventable and curable by early diagnosis and intervention as well as public awareness.

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