



ACUTE GINGIVAL BLEEDING AS AN ORAL MANIFESTATION OF DENGUE HEMORRHAGIC FEVER

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ABSTRACT

INTRODUCTION: Dengue fever (DF) is an acute mosquito borne transmitted disease caused by the DF virus of family Flaviviridae, the most common cause of arboviral disease in the world. Gingival bleeding is one of the important hemorrhagic manifestations of dengue clinically manifesting as petechiae, ecchymosis, gingival bleeding and hematomas.

OBJECTIVE: The aim of present study is to evaluate acute gingival bleeding as an oral manifestation of dengue hemorrhagic fever.

METHODOLOGY: A total of 30 patients were selected for study in the age group of 20-50 years. According to WHO criteria, they were divided into Group A including 10 healthy patients, group B having 10 patients diagnosed with dengue fever (DF) and group C having 10 patients diagnosed with dengue hemorrhagic fever (DHF). Clinical parameters like gingival index (GI) and sulcus bleeding index (SBI) were recorded for all patients and compared.

RESULTS: Group C showed more statistically highly significant ($p < 0.001$) mean gingival index and sulcus bleeding index than group B and A, indicating acute gingival bleeding in dengue hemorrhagic fever.

CONCLUSION: Gingival bleeding is the most common oral manifestation and an early indicator of dengue hemorrhagic fever.

KEYWORDS : Dengue Fever (DF), Dengue Hemorrhagic Fever (DHF), Gingival Index (GI), Sulcus Bleeding Index (SBI)

INTRODUCTION

Dengue fever (DF) is the most common cause of arboviral disease in the world and is an acute mosquito borne transmitted disease caused by virus of family Flaviviridae.¹ It has now become an epidemic affecting people in all parts of our country. Among humans, it is being caused by the mosquito *Aedes aegypti* and is prevalent mostly in the rainy season.² The dengue virus (DENV) has four genetically related but distinct serotypes designated DENV-1, DENV-2, DENV-3 and DENV-4 are circulating world-wide.¹ Although most of the infections are self-limiting and asymptomatic, DENV can lead to grave complications such as dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS).³ Minor hemorrhagic manifestations such as petechiae, epistaxis and gingival bleeding occur in some patients. The most common hemorrhagic manifestations are epistaxis, skin hemorrhages and gastrointestinal hemorrhages.⁴ Considering the association between gingival bleeding and dengue hemorrhagic fever, the present study was aimed to evaluate acute gingival bleeding as an oral manifestation of dengue hemorrhagic fever.

METHODOLOGY

The study conducted was a prospective observational in vivo in which patients visited the Department of Periodontology, Sri Guru Ram Das Institute of Dental Sciences and Research, Sri Amritsar. The study was conducted in accordance with Helsinki Declaration of 1975, as revised in October 2013.

A total of 30 patients were selected for study.

Inclusion Criteria

- Patients aged 20-50 years

- According to WHO, 10 patients diagnosed with dengue fever having platelet count of 1-1.5 lakh/cumm and 10 patients diagnosed with dengue hemorrhagic fever having platelet count of less than 1 lakh/cumm
- Presence of atleast 20 teeth

Exclusion Criteria

- History of any systemic disease and hematologic disorder other than dengue fever
- History of drug allergy and drug intake such as aspirin and anticoagulant therapy
- Any minor or major trauma, general surgical procedure which could have resulted in blood loss
- History of gingivitis and chronic periodontitis
- History of vitamin C deficiency

Study Design

A total of 30 patients were enrolled into following groups who fulfilled inclusion and exclusion criteria:

- Group A (control group)- 10 healthy patients without dengue fever having platelet count of 1.5-3.5 lakh/cumm
- Group B- 10 patients diagnosed with dengue fever having platelet count of 1-1.5 lakh/cumm
- Group C- 10 patients diagnosed with dengue hemorrhagic fever having platelet count of less than 1 lakh/cumm

Periodontal Parameters

Following periodontal parameters were recorded in all patients:

- Gingival index (Loe H and Silness P, 1963)⁵
- Sulcus bleeding index (Muhlemann HR and Son S, 1971)⁶

Hematologic Parameter

- Platelet count

After collecting blood sample and recording all parameters, data was collected from laboratory and compared to arrive at results.

Statistical Analysis

Mean and standard deviation for all parameters was calculated. The statistical significance of difference in independent variables for intergroup measurements over time were tested according to Student's t-test and ANOVA (Analysis of Variance) test.



Figure 1: Showing Gingival Index In Dengue Hemorrhagic

Fever



Figure 2: Showing Sulcus Bleeding Index In Dengue Hemorrhagic Fever



Figure 3: Collection Of Blood Sample For Platelet Count

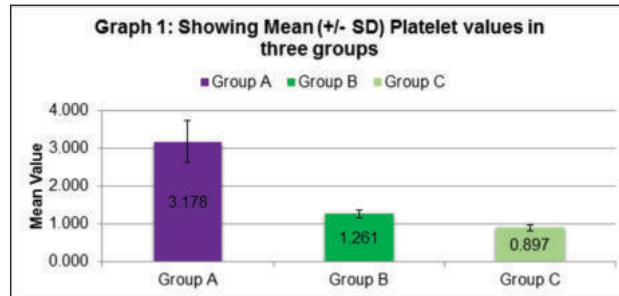
RESULTS

Table 1: Showing Mean Platelet values in three groups

| Group | N | Mean | ± SD | SEM | 95% CI | | Range | | ANOVA [#] | Comp-arison | P value [#] |
|---------|----|-------|-------|-------|--------|-------|----------|----------|---------------------------|-------------|----------------------|
| | | | | | Lower | Upper | Mini Mum | Maxi mum | | | |
| Group A | 10 | 3.178 | 0.554 | 0.175 | 2.782 | 3.574 | 2.08 | 4.00 | F=138.9; p<0.001 ** | Grp A vs B | <0.001** |
| Group B | 10 | 1.261 | 0.108 | 0.034 | 1.184 | 1.338 | 1.12 | 1.45 | | Grp A vs C | <0.001** |
| Group C | 10 | 0.897 | 0.078 | 0.025 | 0.841 | 0.953 | 0.78 | 0.98 | | Grp B vs C | 0.050; NS |

SD: Standard Deviation; SEM: Standard Error of Mean; CI: Confidence Interval

#One-Way ANOVA with Post-Hoc Tukey HSD, NS: p>0.05 Non Significant; **p<0.001 Highly significant



The mean platelet count was 3.178±0.554, 1.261±0.108 and 0.897±0.078 in group A, B and C respectively which was found to be statistically non-significant (p>0.05). On intergroup comparison, group C showed lower mean value of platelet count than group B which

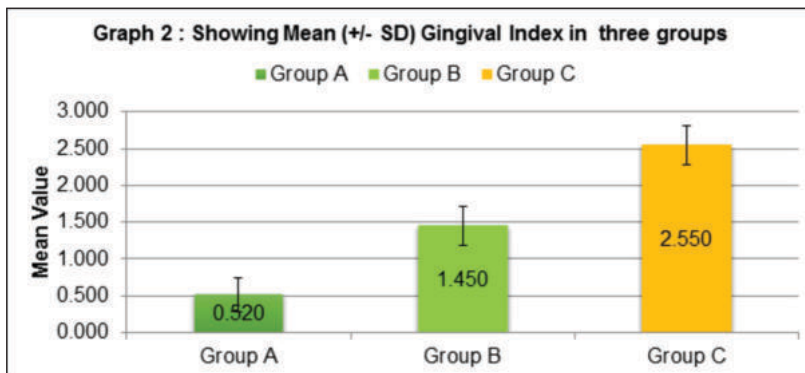
was found to be statistically non-significant (p>0.05). Similarly, group B showed lower mean value of platelet count than group A which was found to be statistically highly significant (p<0.001) on intergroup comparison.

Table 2: Showing Mean Gingival Index in three groups

| Group | N | Mean | ± SD | SEM | 95% CI | | Range | | ANOVA [#] | Comp-arison | P value [#] |
|---------|----|-------|-------|-------|--------|-------|----------|----------|--------------------|-------------|----------------------|
| | | | | | Lower | Upper | Mini-mum | Maxi-mum | | | |
| Group A | 10 | 0.520 | 0.230 | 0.073 | 0.356 | 0.685 | 0.20 | 0.90 | F=157.8p<0.001** | Grp A vs B | <0.001** |
| Group B | 10 | 1.450 | 0.272 | 0.086 | 1.256 | 1.645 | 1.10 | 1.90 | | Grp A vs C | <0.001** |
| Group C | 10 | 2.550 | 0.264 | 0.083 | 2.362 | 2.739 | 2.10 | 2.90 | | Grp B vs C | <0.001** |

SD: Standard Deviation; SEM: Standard Error of Mean; CI: Confidence Interval

#One-Way ANOVA with Post-Hoc Tukey HSD, NS: p>0.05 Non Significant; **p<0.001 Highly significant



The mean value of gingival index was 0.520 ± 0.230 , 1.450 ± 0.272 and 2.550 ± 0.264 which was found to be statistically non-significant ($p > 0.05$) in group A, B and C

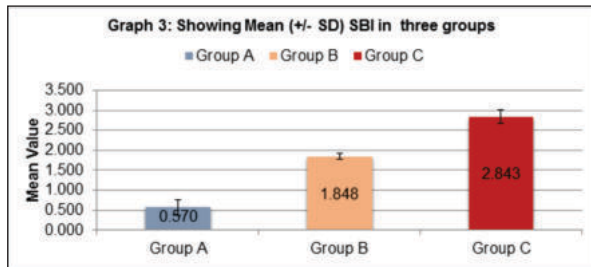
respectively. On intergroup comparison between group A, B and C, group C showed more statistically highly significant mean value of gingival index than group A and B.

Table 3: Showing Mean Sulcus Bleeding Index in three groups

| Group | N | Mean | ± SD | SEM | 95% CI | | Range | | ANOVA [#] | Comparison | P value [#] |
|---------|----|-------|-------|-------|--------|-------|----------|----------|--------------------|------------|----------------------|
| | | | | | Lower | Upper | Mini-mum | Maxi-mum | | | |
| Group A | 10 | 0.570 | 0.189 | 0.060 | 0.435 | 0.705 | 0.30 | 0.90 | F=567.0; p<0.001** | Grp A vs B | <0.001** |
| Group B | 10 | 1.848 | 0.078 | 0.025 | 1.792 | 1.904 | 1.67 | 1.96 | | Grp A vs C | <0.001** |
| Group C | 10 | 2.843 | 0.164 | 0.052 | 2.726 | 2.960 | 2.55 | 3.02 | | Grp B vs C | <0.001** |

SD: Standard Deviation; SEM: Standard Error of Mean; CI: Confidence Interval

#One-Way ANOVA with Post-Hoc Tukey HSD: NS: $p > 0.05$ Non Significant; ** $p < 0.001$ Highly significant



The mean value of sulcus bleeding index was 0.570 ± 0.189 , 1.848 ± 0.078 and 2.843 ± 0.164 which was found to be statistically non-significant ($p < 0.05$) in group A, B and C respectively. On intergroup comparison between group A, B and C, group C showed more statistically highly significant mean value of sulcus bleeding index than group A and B which indicated more gingival bleeding in patients with dengue hemorrhagic fever i.e. in group C than group A and B, determining the association between gingival bleeding as an oral manifestation and dengue hemorrhagic fever.

DISCUSSION

Dengue fever is one of the most prevalent mosquito-borne viral infection affecting humans with multiple outbreaks recorded every year.⁷ Infection with dengue fever can cause 3 clinical syndromes with classic dengue fever (DF), dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS).⁸ Dengue fever can be without hemorrhage or with usual hemorrhage while DHF can be without shock or with shock i.e. dengue shock syndrome.⁹

Clinical manifestations of dengue infection ranges from fever, headache, arthralgia, myalgia and skin rashes to severe hemorrhagic shock.¹ The patients in present study had grade II DHF because they had gingival bleeding, ecchymosis and petechiae without progression to shock.

Chen et al. (2008)¹⁰ conducted a study in which 54-year-old male patient presented with fever, bone pain, gum bleeding, scrotal and penile edema with thrombocytopenia (platelet count $< 14,000/mm^3$) and hematocrit elevated to 45.5%. The patient's sera showed positive seroconversion of IgG and IgM antibody to DENV.

Butt et al. (2008)¹¹ examined 104 patients with fever less than 2 weeks duration with generalized morbiliform rash and bleeding manifestations with positive serum for anti-dengue IgM and IgG using polymer chain reaction. Nearly, 81.73% patients presented with fever followed by generalized morbiliform rash, 62.5% backache and 34.6% with mucosal bleeding manifestations. Laboratory findings in these patients were thrombocytopenia, leucopenia, raised hematocrit and increased mortality rate.

Plasma leakage is the hallmark in pathogenesis of bleeding manifestations in DHF.¹² Also, there is excessive production of

cytokines and chemokines including C3a, C5a, TNF-alpha, Interleukin-2, 4, 6, 8, 10, Interferon-gamma and histamine.¹³ Activation of these inflammatory mediators disrupt endothelium leading to increased vascular permeability, leucopenia, thrombocytopenia, activation of coagulation cascade and fibrinolysis.¹⁴

Therefore, impairment of platelet function can cause vascular fragility leading to gingival hemorrhage, an important mechanism of plasma leakage.¹⁵ Thus, the close monitoring of signs of bleeding to provide timely management is the mainstay of DHF.

CONCLUSION

Gingival bleeding is the most common oral manifestation and an early indicator of dengue hemorrhagic fever. Also, thorough history along with proper diagnosis of episodes of acute gingival bleeding by the dentist who can actually diagnose and refer these patients for proper management is necessary and can save one's life.

REFERENCES

- Khan, S., Gupta, N. D., & Maheshwari, S. (2013). Acute gingival bleeding as a complication of dengue hemorrhagic fever. *J Indian Soc Periodontol*, 17(4), 520-522.
- Bhardwaj, V. K., Negi, N., Jhingta, P., & Sharma, D. (2016). Oral manifestations of dengue fever: A rarity and literature review. *Euro J Gen Dent*, 5(02), 95-98.
- Raza, M. A., Khan, M. A., Ejaz, K., Haider, M. A., & Rasheed, F. (2020). A Case of Dengue Fever with Hemorrhagic Manifestations. *Cureus*, 12(6), 8581.
- Bansal, R., Goyal, P., Agarwal, D. C. (2022). Bleeding from gums: Can it be a dengue. *Dent Hypotheses*, 5(3), 121-123.
- Loe, H. (1967). The Gingival Index, Plaque Index and Retention Index Systems. *J Periodontol*, 38(6), 610-616.
- Mühlemann, H. R., & Son, S. (1971). Gingival sulcus bleeding--a leading symptom in initial gingivitis. *Helv Odontol Acta*, 15(2), 107-113.
- Arora, S., Nathaniel, S. D., Paul, J. C., & Hansdak, S. G. (2015). Case Report: Acute liver failure in dengue hemorrhagic fever. *BMJ Case Reports*, 2015.
- World Health Organization. (1997). Dengue hemorrhagic fever: diagnosis, treatment, prevention and control. World Health Organization.
- Sellahewa, K. H. (2013). Pathogenesis of dengue hemorrhagic fever and its impact on case management. *Int Scholar Res Notices*, 2013.
- Chen, T. C., Lu, P. L., Chen, Y. H., Tsai, J. J., & Chen, T. P. (2008). Dengue hemorrhagic fever complicated with acute idiopathic scrotal edema and polyneuropathy. *Am J Trop Med Hyg*, 78(1), 8-10.
- Butt, N., Abbassi, A., Munir, S. M., Ahmad, S. M., & Sheikh, Q. H. (2008). Hematological and biochemical indicators for the early diagnosis of dengue viral infection. *J Coll Physicians Surg Pak*, 18(5), 282-285.
- Matthias, A. T., Apsara, S., & Epa, A. (2019). A case report of dengue hemorrhagic fever complicated with psoas hematoma requiring blood transfusion. *BMC Infect Dis*, 19(1), 385.
- Rajapakse, S., Rodrigo, C., Maduranga, S., & Rajapakse, A. C. (2014). Corticosteroids in the treatment of dengue shock syndrome. *Infect Drug Resist*, 7, 137-143.
- Chuansumrit, A., & Chaiyaratana, W. (2014). Hemostatic derangement in dengue hemorrhagic fever. *Thromb Res*, 133(1), 10-16.
- World Health Organization. (2001). Dengue and dengue hemorrhagic fever: chapter 6 of WHO Report on Global Surveillance of Epidemic-prone Infectious Diseases.