CDA JOURNAL, VOL 50, N°11

C.E. Credit

Management of Hypertensive Crisis in a Dental School: 10-Year Retrospective Review of Medical Emergency Incidents With Recommendations

Soh Yeun Kim, DDS; Sarah Lim, BA; Lauren Barlow, BS; Chanmee Esther Kim, BS; Adlene Chang, BA; Holli Riter, DDS; Iris Nam, DDS; Heidi Christensen, DDS; and Udochukwu Oyoyo, MPH

ABSTRACT

Background: The objective of this study was to analyze the type and frequency of medical emergency calls made at the Loma Linda University School of Dentistry (LLUSD) and to reinforce the guideline for the most frequent incident.

Methods: Emergency call data from the past 10 years at LLUSD were collected and categorized according to the type and frequency of medical emergencies. The most frequent emergency data was identified, and additional information was gathered using the patients' electronic health records in the axiUm database.

Results: Emergency calls related to hypertension (HTN) were the most common emergency calls encountered at LLUSD and comprised 32.9% of the calls (95% confidence interval (CI): 29.1, 36.9). HTN-related calls peak at age groups 50 to 80 ($P < 0.05$). Seventy-seven percent of patients who had emergency calls had an existing HTN. Out of the total HTN incidences, 11% were transported to the emergency room (ER) (95% CI: 7.86, 12.2).

Conclusions: The most frequent medical emergency call at LLUSD was related to hypertension. A revised HTN guideline is recommended to guide dental providers to determine when to call emergency medical service (EMS) or when to consider a medical consultation with a patient's physicians to minimize reports that do not require immediate management. Providers must also consider the patient's individual health history, background and comorbidity.

CDA JOURNAL, VOL 50, N°11

Practical implications: The proposed updated HTN treatment guideline will guide dentists or staff on whether to call EMS for immediate treatment or refer to a patient's physician for HTN care.

Keywords: Medical emergency, hypertension, hypertensive emergency, hypertensive urgency, guideline

AUTHORS

Soh Yeun Kim, DDS, is an assistant professor and course director of patient-centered care II at the Loma Linda University School of Dentistry.

Sarah Lim, BA, is a fourth-year dental student at the Loma Linda University School of Dentistry.

Lauren Barlow, BS, is a fourth-year dental student at the Loma Linda University School of Dentistry.

Chanmee Esther Kim, BS, is a fourth-year dental student at the Loma Linda University School of Dentistry.

Adlene Chang, BA, is a fourth-year dental student at the Loma Linda University School of Dentistry.

Holli Riter, DDS, is an associate professor and a director for the special care dentistry department at the Loma Linda University School of Dentistry.

Iris Nam, DDS, is an assistant professor and clinician in the special care dentistry department at the Loma Linda University School of Dentistry.

Heidi Christensen, DDS, is a professor and patient care manager at the Loma Linda University School of Dentistry.

Udochukwu Oyoyo, MPH, is an assistant professor and statistician at the Loma Linda University School of Dentistry.

Conflict of Interest Disclosure: None reported for all authors.

Medical emergencies in a dental office setting are not unexpected. As the human lifespan increases, so does the incidence of chronic disease.[1,2] This in turn means that the likelihood of having a serious medical emergency in the dental environment also increases.[3] While there is limited data available as to the frequency of medical emergencies in dental settings, survey data showed that 3 in 4 dentists report having some kind of medical emergency in their office.[4] Recent trends in the health care environment require that dental health professionals become more involved in the management of the general health of patients and address related emergencies when they arise.

Although the majority of the emergencies in a dental setting are not life threatening,[5] the dental practitioner needs to be prepared for all types of emergencies. Proper training for medical emergencies is part of the dental school curriculum, but dentists and dental students often report that they feel underprepared to handle the emergencies in their practices.[6] The Commission on Dental Accreditation (CODA) provides accreditation standards for dental education programs. CODA Standard 2-23 states that students "must be competent in providing oral health care within the scope of general dentistry, as defined by the school" including "dental emergencies,"[7] which we define to include medical emergencies. Despite the preparation and education on emergencies taught in dental school, dealing with medical emergencies often causes high anxiety among dental students and practicing dentists. In order to better educate students on ways to reduce potential risks and to improve the quality of care delivered, it is important that we identify the adverse events seen most commonly in the dental education setting. It is vital to improve the management process of medical emergencies, dental professionals' awareness and education and reduction of the frequency of medical emergencies.[8]

Identifying ways to reduce dental-setting emergencies and training dental students to look for prevention strategies is of high importance. A recent investigation found that 35% of dental patients who had an emergency in the dental office had a history of systemic disease, with about a third of those patients having a history of cardiovascular disease.[9] The ability to collect and interpret a thorough health history as well as to correlate the health history with potential medical emergencies are vital to the improvement of the level of preparedness of the dental team and the reduction of anxiety related to managing emergencies during dental treatment.

This 10-year retrospective study analyzes the past medical emergency in-house calls at the Loma Linda University School of Dentistry (LLUSD). The objective of this study was to analyze the type and frequency of emergency call reports made in LLUSD and to reinforce the guideline for the most frequent incident to aid in decision-making of the

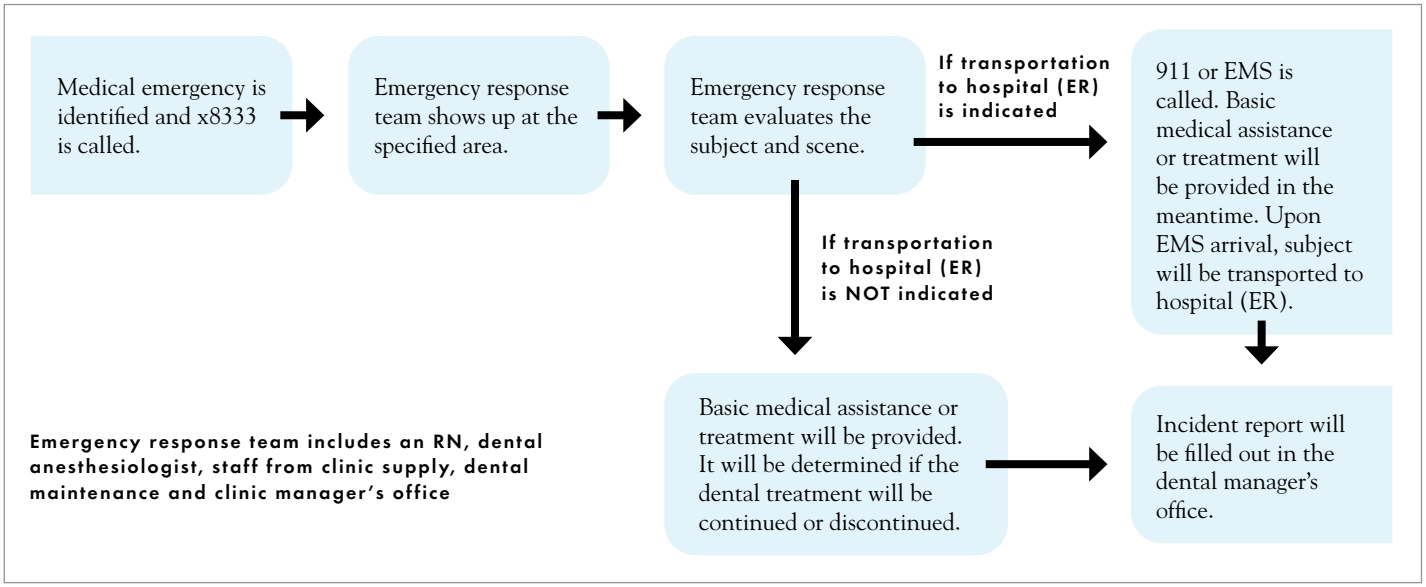


FIGURE 1. LLUSD in-house emergency call (8333) flow chart.

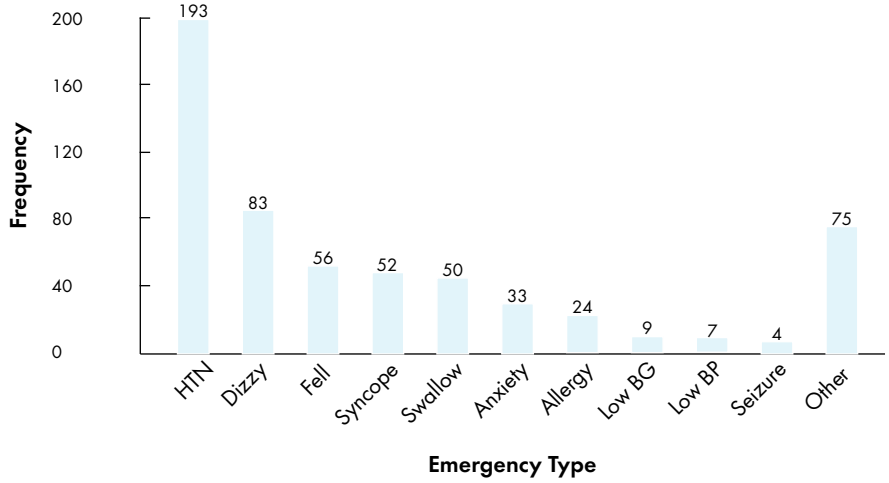
students, staff, faculty and other dental professionals. This study is unique in that the most common emergency call in a dental school setting is analyzed and the trend of the most common emergency is further investigated.

Methods and Materials

This retrospective study was reviewed and approved by the Loma Linda University Institutional Review Board (IRB #5210442). In order to manage medical emergencies at LLUSD, an immediate response protocol is in place for any medical emergencies that occur within the dental school building during regular business hours (**FIGURE 1**). All predoctoral and most postdoctoral dental clinics are located in this building. The emergency team responds to all emergencies called through an in-house emergency call number, 8333, whether the subject is a dental school patient, student, faculty member, staff or visitor. The response team includes a registered nurse and dentist anesthesiologist from the dental anesthesia department, a clinic supply staff member who is responsible for the emergency code cart (**FIGURE 2**), a dental maintenance staff member for crowd control and a staff member from the dental clinic manager's office. The latter is responsible for completion of the incident report of the emergency, using a medical emergency report and submitting an unusual occurrence report (UOR) form. These reports are compiled and stored in the dental clinic manager's office and are reviewed at the request of the clinical quality assurance committee. Recommendations for changes, updates or other process improvements will then be given to the appropriate stakeholders.

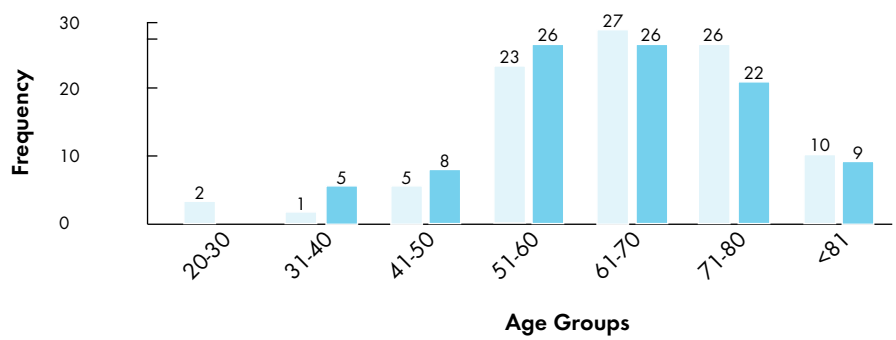
Medical emergency incident data from January 2012 to October 2021 in which an internal or in-house medical emergency call was dialed was collected from the medical emergency reports compiled from the LLUSD clinic manager's office. The data were analyzed after being summarized by type and frequency of medical emergency calls. The most frequent emergency data was identified, and additional information was gathered using the patients' electronic health record in the axiUm database. This information included the subject's age, gender and history of hypertension. The information regarding the necessity of transportation to an ER of the hospital was obtained from the compiled report stored in the LLUSD

FIGURE 2. LLUSD emergency code cart.



Incidences	Frequency
Hypertension	193
Dizzy	83
Fall/trip	56
Syncope	52
Swallow	50
Anxiety	33
Allergy	24
Hypoglycemia	9
Low BP	7
Seizure	4
Other	75
Total number of incidences in past 10 years	**586**

FIGURE 3. Types and frequencies of LLUSD in-house medical emergency calls (8333 calls).



Hypertension age group	Female	Male
20–30	2	0
31–40	1	5
41–50	5	8
51–60	23	26
61–70	27	26
71–80	26	22
< 81	10	9
Totals (3 unknown)	**94**	**96**

FIGURE 4. Frequencies of LLUSD in-house medical emergency calls (8333 calls) by age group.

clinic manager's office. Descriptive statistics including frequencies and proportions were used to characterize the cohort data; jamovi software was utilized for analysis, and 95% confidence intervals (CI) are reported where appropriate.

Results

Overall, 586 in-house medical emergency calls were recorded during the duration of this study from January 2012 to October 2021. **FIGURE 3** presents the types and frequency of emergency incidents in descending order. Emergency calls related to hypertension (HTN) were the most common emergency calls encountered at LLUSD. A total of 193 calls were made for HTN, which comprised 32.9% of the calls (95% CI: 29.1, 36.9). The second most common type of medical emergency calls was dizziness, of which 83 incidents were recorded (95% CI: 11.4, 17.3). The frequency of falling was 56, syncope was 52 and swallowing objects such as crowns, burs or instruments was 50. Anxiety followed with a frequency of 33, allergy was 24, low blood glucose was nine, low blood pressure was seven and seizure was four. The category of "other" includes nausea, chest pain, nosebleed, throat irritation, high blood sugar, shortness of breath, stroke symptoms, presyncope (a feeling that you may faint but you do not), stomach pain, wheezing, swelling of ankles, knee pain, cold and shaking, pain, weakness, unresponsive, extensive bleeding, palpitations, headache and uncategorized. **FIGURE 4** breaks down HTN incidences by age group and gender. Age was categorized into seven categories ranging from 20 to 81 and older and divided into 10-year intervals. Each age group contains a male and female bar, and female data is indicated by light blue color while male data is indicated by dark blue. There was no difference between incidences by gender, but the data indicated higher incidences with increasing age ($p < 0.05$). The difference of frequency between the genders varies no more than four, and the overall data creates a bell curve leaning to the right. The bell curve peaks at age groups 50-80 and the overall data

indicates higher incidences with age.

FIGURE 5 represents the percent of calls made for patients who lacked or had prior diagnosis of HTN. Seventy-seven percent of patients who had emergency calls made reported that they have existing HTN conditions.

FIGURE 6 describes the frequency of yearly HTN calls and those that were transported to the ER upon evaluation from the in-house medical team. HTN-related emergency calls were made the most in 2013 and 2019; 31 and 30 calls were made respectively. Out of the total HTN incidences from 2012 to 2021, 11% were transported to the ER, which shows 95% confidence intervals (95% CI: 7.86, 12.2).

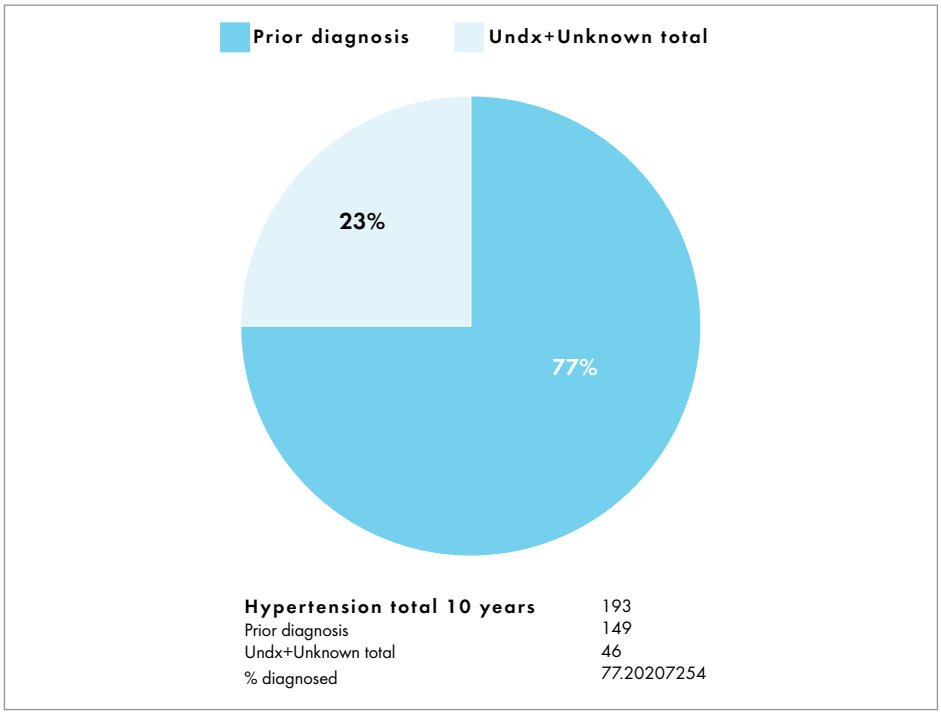


FIGURE 5. HTN-related calls and existing HTN history.

Discussion

In this retrospective study, we gathered data on the types and frequency of medical emergencies at LLUSD over a 10-year period. The most common type of medical emergency call at LLUSD in the past 10 years was high blood pressure-related calls comprising 32.9% of all calls. This finding was significant to focus on hypertension-related emergency calls. The second most common calls were dizziness, having been observed in 14.2% of emergency calls. HTN-related calls were observed more than twice as frequently as dizziness.

In May 2020, according to the American Heart Association (AHA), nearly half of U.S. adults — an estimated 116 million — have high blood pressure.[10] High blood pressure is defined as a systolic reading of 130 or higher or diastolic of 80 or higher. AHA news also stated that the percentage of people who have hypertension in the U.S. increases as they age,[10] and this trend was also found in HTN-related calls at LLUSD ($P < 0.05$). More calls were made for the 50-80 age groups.

The HTN treatment guidelines developed at LLUSD in 2009 (**TABLE 1**) assert that any blood pressure (BP) over 180/110 mmHg is a contraindication for any dental treatment. According to the American College of Cardiology and AHA, the 2017 guidelines for hypertensive crisis is 180/120 mmHg or greater.[11] HTN crisis can be defined as a hypertensive emergency or urgency depending on the involvement of organ damage. Hypertensive emergency is a rapid increase in blood pressure that can result in end-organ damage.[12] Hypertensive urgency is characterized by an increase in blood pressure without showing signs or symptoms of acute organ damage and does not involve immediate risk; therefore, the treatment for hypertensive urgency can be done after the patient is dismissed within 24 to 48 hours, and oral antihypertensive therapy or medication is usually sufficient.[13–16] Whelton et al. stated that these hypertensive urgency patients are not having a hypertensive emergency and therefore do not require immediate BP reduction in the emergency department.[11] However, recognizing or identifying hypertensive emergencies is very critical because end-organ damage can cause fatal medical situations[12] that need hospital assistance.[13] When organs are affected, immediate intervention in a hospital or intensive care setting is required to lower the blood pressure.[12,14,17] Associated symptoms can include chest pain, headache, vision changes, shortness of breath, nausea, vomiting, confusion, etc. With these symptoms present, a patient should be referred to EMS to be transported to a high level of care in order to prevent further organ damage or other adverse sequelae.[12] Associated examples of organ damage include acute ischemic stroke, acute myocardial infarction, unstable angina pectoris, acute renal failure and dissecting aortic aneurysm.[11]

A systematic review done by Astarita et al. regarding hypertensive emergencies and urgencies in the emergency department showed that both hypertensive emergencies and urgencies are frequent reasons of emergency room visits, and hypertensive urgencies were significantly more common than hypertensive emergencies.[18] Hypertensive

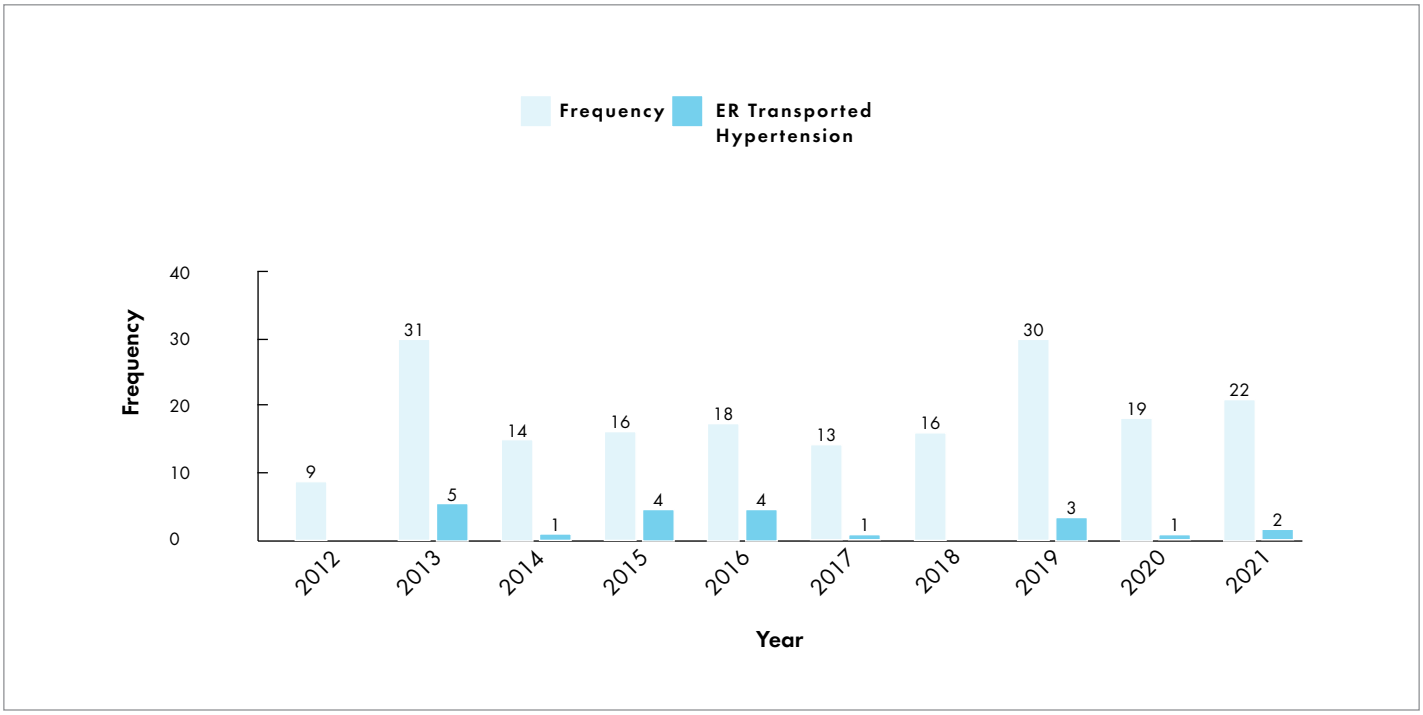


FIGURE 6. Yearly frequency of hypertension calls and ER transported.

TABLE 1

Current LLUSD Hypertension Treatment Guideline

Systolic BP	Diastolic BP	Medical risk factors present	Recommendations
120–139	80–89	Yes or no (see examples in the caption below)	Routine dental care OK; discuss BP guidelines with patient
140–160	90–99	Yes/no	Routine dental care OK; consider stress reduction protocol; recommend medical consult
161–179	100–109	No	Routine dental care OK; consider stress reduction protocol; recommend medical consult
161–179	100–109	Yes	Urgent dental care only; consider stress reduction protocol; medical consult required before further treatment
180–209	110–119	No	No dental treatment without a medical consult; refer for prompt medical consult
180–209	110–119	Yes	No dental treatment; refer for emergency medical treatment
> 209	> 109	Yes/no	No dental treatment; refer for emergency medical treatment

Examples of medical risk factors: medical history of myocardial infarction, angina pectoris, high coronary artery disease risk, recurrent stroke history, diabetes, chronic renal disease, pregnancy, patient age factor, etc.

TABLE 2

LLUSD Proposed Updated Hypertension Treatment Guideline With Recommended Additions

Systolic BP/Diastolic BP	Medical risk factors present	Recommendations
120-129/ and /<80	Yes/No	No contraindications to routine dental care. Discuss BP guidelines with patient.
130-160/ or /80-99	Yes/No	Minimal risk to routine dental care. Stress reduction protocol; recommend medical consult.
161-180/ or /100-120	No	Routine dental care with precautions. Stress reduction protocol, refer for medical consult.
161-180/ or /100-120	Yes	Urgent dental care only. Stress reduction protocol; medical consult required for further treatment.
>180/ and/or />120	Yes/No	No dental treatment without a medical consult. Refer for medical consult. No dental treatment.
>209/ and/or />120		Refer immediately to patient's primary care provider or urgent care.

If any symptoms of hypertensive crisis are present, call in-house medical emergency number (or call EMS if it is private practice setting).

HTN crisis signs or symptoms: Headache, altered mental status, blurred vision, numbness or weakness, pressure or tightness in the chest, chest discomfort or pain, difficulty breathing, diaphoresis, dizziness, nausea and vomiting, etc.

Risk factors or comorbidities: Medical history of myocardial infarction, angina pectoris, high coronary artery disease, recurrent stroke history, diabetes, chronic renal disease, patient age factor, seizure, anxiety, etc.

Pregnant patients: Any pregnant patient with a systolic blood pressure >160 or diastolic >110 should not receive routine care and should be referred to the patient's prenatal care provider immediately.[25]

urgency was also the more common trend found in LLUSD. After analyzing the emergency call data at LLUSD, it was determined that the asymptomatic or nonemergent HTN calls were more prevalent than symptomatic calls. Among the HTN-related calls, 11% were transported to the emergency department, and these can be considered hypertensive emergencies (FIGURE 6). Many BP reading levels that prompted in-house medical emergency calls did not have to be considered a true emergency, as the patients could have been referred to a physician or urgent care facility with a medical consultation. In practice, this lack of distinction could result in an unnecessary call to EMS. Based on this study, additional education or proposed updated institutional guidelines (TABLE 2) regarding management of HTN patients would be beneficial to students, faculty and staff to help make better decisions regarding emergency calls and disposition of patients with high blood pressure in a dental setting.

Hypertension is commonly seen in dental settings. One study done by Kellog and Gabetti showed that nearly one-third of the sample patients in their dental school clinic had high blood pressure and emphasized the importance of monitoring hypertensive patients and providing appropriate dental care.[19] Seventy-seven percent of patients who had HTN-related emergency calls at LLUSD had a history of existing hypertension (FIGURE 5), and their HTN measurement at the time of their LLUSD dental appointment was high enough to make the calls. The prevalence study of hypertension at a dental school shows that HTN is often undiagnosed or uncontrolled;[20] therefore, the role of dental professionals is vital in that dental clinicians can help patients receive more managed treatment for their hypertension by sending a medical consultation or referring patients to physicians. Twenty-three percent of patients who had HTN-related emergency calls at LLUSD did not report a history of diagnosed hypertension (FIGURE 5), and they may have benefited from referral to a medical provider to evaluate their high blood pressure and possibly diagnose hypertension.

When hypertension is noted, several factors must be considered. Several measurements of blood pressure need to be done to confirm the finding, and potential high blood pressure triggers should be looked into.[13] Errors in measurement of blood pressure are common; therefore, appropriate patient preparation and use of accurate measurement technique are vital parts of proper blood pressure evaluation.[11]

Clinicians must consider if a patient has dental anxiety as a trigger because anxiety is associated with blood pressure elevation.[21] The possibility of white coat hypertension also needs to be screened at dental offices. The prevalence is higher with older patients, and 1% to 5% of white coat hypertension may convert to sustained hypertension, which shows elevated blood pressure both in-office and out-of-office settings.[11] Clinicians must check if the patient took their scheduled blood pressure medications as well.

Comorbidity is also significantly important. Certain risk factors or comorbidities may limit the treatment guidelines and affect the decision-making process.[11] When a patient has other medical risk factors, a patient's cardiovascular disease can result in a very serious emergency situation. One case report done by Thoms et al. showed the case of a patient with a history of hypertension, angina, end-stage renal disease and other conditions who had a cardiovascular collapse during a routine dental procedure.[22] This life-threatening situation can happen in any dental clinic. This case study also suggested that the emergency response plan needs to be developed to minimize serious events during the dental procedure. According to the study by Southerland et al., risk factors for hypertension include age, obesity, family history, race, diabetes, dyslipidemia, tobacco use, stress, high-sodium diet and depression.[23]

Providing dental students with appropriate education regarding how to manage hypertension patients in a dental setting is crucial. First-year dental students at LLUSD are introduced to the HTN treatment guideline with a lecture. Second-year dental students learn HTN in depth in the pathology class and are further trained with case-based scenarios regarding HTN patients. They are also tested on how to measure blood pressure accurately and on the management of HTN patients with different scenarios during objective structured clinical examination (OSCE). Third- and fourth-year students apply the knowledge to their actual patient care setting. The students may need additional calibrations or training updates to make sure they are up to date with the guideline, as repeating simulation or scenario-based training has been shown to be beneficial. A study by Manton et al. showed the resident groups who received simulation-based medical emergency curriculum performed significantly better than the residents in a control group.[24]

The possibility of white coat hypertension also needs to be screened at dental offices.

The significance of this study is that it identified the most common emergency calls in a dental school setting in the last 10 years with 95% confidence interval, and the trend emphasized the importance of following HTN guidelines to make decisions on HTN patient management. Members of LLUSD and readers in other dental-profession settings will gain knowledge from this project for the trend of hypertensive crisis and when it is appropriate to call EMS during hypertensive crisis. The proposed updated LLUSD HTN treatment guideline, which includes HTN emergency symptoms and updated HTN measurement readings (**TABLE 2**), can be utilized in any dental school settings to educate students, faculty and staff and aid the decision of providing patients with dental treatment or disposition of patients with HTN when the patients do not present emergent symptoms. It will also be useful in private-practice settings as it will guide dentists or staff on whether to call EMS or refer to a patient's physician for HTN treatment. Patients with nonemergent hypertension can be seen safely in the clinic[12] when clinicians follow the HTN management guidelines.

The limitation of this study is that only HTN-related calls and trends were the focus of this project. Because nearly one-third of the total emergency calls were HTN related, this was considered significant enough to investigate and make the project's sole focus. However, addressing other common emergency calls (dizziness, falling, swallowing objects, etc.) in more detail could be future research projects.

Conclusion

The most frequent medical emergency call at LLUSD was hypertension (HTN). A revised HTN treatment guideline is recommended to guide dental providers to determine when to call EMS or when to consider medical consultation of HTN patients. Providers must also consider the patient's individual health history, background and comorbidity. ■

REFERENCES

1. Anders P, Comeau R, Hatton M, Neiders M. The nature and frequency of medical emergencies among patients in a dental school setting. *J Dent Educ* 2010;74(4):392–6.
2. Niessen LC, Fedele DJ. Aging successfully: Oral health for the prime of life. *Compend Contin Educ Dent* 2002 Oct;23 Suppl 10:4–11.
3. Dym H. Preparing the dental office for medical emergencies. *Dent Clin North Am* 2008 Jul;52(3):605–8, x. doi: 10.1016/j.cden.2008.02.010.
4. Collange O, Bildstein A, Samin J, et al. Letter to editor: Prevalence of medical emergencies in dental practice. *Resuscitation* 2010 Jul;81(7):915–6. doi: 10.1016/j.resuscitation.2010.03.039.
5. Haas D. Management of medical emergencies in the dental

office: Conditions in each country, the extent of treatment by the dentist. *Anesth Prog* 2006 Spring;53(1):20–4. doi: 10.2344/0003-3006(2006)53[20:MOMEIT]2.0.CO;2. PMCID: PMC1586863.
6. Clark M, Wall B, Tholström TC, et al. A 20-year follow-up survey of medical emergency education in U.S. dental schools. *J Dent Educ* 2006 Dec;70(12):1316–9.
7. Commission on Dental Accreditation. Accreditation standards for dental education programs. Chicago: American Dental Association; 2017.
8. Sorenson AD, Marusko RM, Kennedy KS. Medical emergencies in the dental school setting. *J Dent Educ* 2021 Jul;85(7):1223–1227. doi: 10.1002/jdd.12590. Epub 2021 Mar 22. PMID: 33754336.
9. Alhamad M, Alnahwi T, Alshayeb H, et al. Medical emergencies encountered in dental clinics: A study from the Eastern Province of Saudi Arabia. *J Fam Community Med* 2015 Sep–Dec;22(3):175–9. doi: 10.4103/2230-8229.163038.
10. American Heart Association. Is high blood pressure inevitable? Here's how to keep it in check. 2020, May 18.
11. Whelton PK, Carey RM, Aronow WS, Casey DE Jr., Collins KJ, Dennison Himmelfarb C, DePalma SM, Gidding S, Jamerson KA, Jones DW, MacLaughlin EJ, Muntner P, Ovbiagele B, Smith SC Jr, Spencer CC, Stafford RS, Taler SJ, Thomas RJ, Williams KA Sr, Williamson JD, Wright JT Jr. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA. Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Hypertension* 2018 Jun;71(6):e13–e115. doi: 10.1161/HYP.0000000000000065. Epub 2017 Nov 13. Erratum in: *Hypertension* 2018 Jun;71(6):e140–e144. PMID: 29133356.
12. Suneja M, Sanders ML. Hypertensive emergency. *Med Clin North Am* 2017 May;101(3):465–478. doi: 10.1016/j.mcna.2016.12.007. Epub 2017 Mar 2. PMID: 28372707.
13. Sobrino Martínez J, Doménech Feria-Carot M, Morales Salinas A, Coca Payeras A. Crisis hipertensivas: Urgencia y emergencia hipertensiva [Hypertensive crisis: Urgency and hypertensive emergency]. *Medwave* 2016 Nov 18;16(Suppl4):e6612. Spanish. doi: 10.5867/medwave.2016.6612. PMID: 28055998.
14. Henny-Fullin K, Buess D, Handschin A, Leuppi J, Dieterle T. Hypertensive Krise [Hypertensive urgency and emergency]. *Ther Umsch* 2015 Jun;72(6):405–11. German. doi: 10.1024/0040-5930/a000693. PMID: 26098191.
15. Maloberti A, Cassano G, Capsoni N, Gheda S, Magni G, Azin GM, Zacchino M, Rossi A, Campanella C, Beretta ALR, Bellone A, Giannattasio C. Therapeutic approach to hypertension urgencies and emergencies in the emergency room. *High Blood Press Cardiovasc Prev* 2018 Jun;25(2):177–189. doi: 10.1007/s40292-018-0261-4. Epub 2018 May 18. PMID: 29777395.
16. Bales A. Hypertensive crisis. How to tell if it's an emergency or an urgency. *Postgrad Med* 1999 May 1;105(5):119–26, 130. doi: 10.3810/pgm.1999.05.1.735. PMID: 10335324.
17. Adebayo O, Rogers RL. Hypertensive emergencies in the emergency department. *Emerg Med Clin North Am* 2015 Aug;33(3):539–51. doi: 10.1016/j.emc.2015.04.005. Epub 2015 May 30. PMID: 26226865.
18. Astarita A, Covella M, Vallelonga F, Cesareo M, Totaro S, Ventre L, Aprà F, Veglio F, Milan A. Hypertensive emergencies and urgencies in emergency departments: A systematic review and meta-analysis. *J Hypertens* 2020 Jul;38(7):1203–1210. doi: 10.1097/HJH.0000000000002372. PMID: 32510905.
19. Kellogg SD, Gobetti JP. Hypertension in a dental school patient population. *J Dent Educ* 2004 Sep;68(9):956–64. PMID: 15342656.
20. Gordy FM, Le Jeune RC, Copeland LB. The prevalence of hypertension in a dental school patient population. *Quintessence Int* 2001 Oct;32(9):691–5. PMID: 11695137.
21. Ifeagwazi CM, Egberi HE, Chukwuorji JC. Emotional reactivity and blood pressure elevations: Anxiety as a mediator. *Psychol Health Med* 2018 Jun;23(5):585–592. doi: 10.1080/13548506.2017.1400670. Epub 2017 Nov 6. PMID: 29105504.
22. Thoms S, Cooke M, Crawford J. Cardiovascular collapse associated with irreversible cardiomyopathy, chronic renal failure and hypertension during routine dental care. *Anesth Prog* 2016 Spring;63(1):34–41. doi: 10.2344/0003-3006-63.1.34. PMID: 26866410; PMCID: PMC4751519.
23. Southerland JH, Gill DG, Gangula PR, et al. Dental management in patients with hypertension: Challenges and solutions. *Clin Cosmet Investig Dent* 2016 Oct 17;8:111–120. doi: 10.2147/CCIDE.S99446. eCollection 2016. PMCID: PMC5074706.
24. Manton JW, Kennedy KS, Lipps JA, Pfeil SA, Cornelius BW. Medical emergency management in the dental office (MEMDO): A pilot study assessing a simulation-based training curriculum for dentists. *Anesth Prog* 2021 Jun 1;68(2):76–84. doi: 10.2344/anpr-67-04-04. PMID: 34185862; PMCID: PMC8258755.
25. Brown MA, Magee LA, Kenny LC, Karumanchi SA, McCarthy FP, Saito S, Hall DR, Warren CE, Adoyi G, Ishaku S. International Society for the Study of Hypertension in Pregnancy (ISSHP). The hypertensive disorders of pregnancy: ISSHP classification, diagnosis and management recommendations for international practice. *Hypertension* 2018 Jul;13:291–310. doi: 10.1016/j.preghy.2018.05.004. Epub 2018 May 24. PMID: 29803330.

THE CORRESPONDING AUTHOR, Soh Yeun Kim, DDS, can be reached at sokim@llu.edu.