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EDITOR'S NOTE

PROTECT KIDS! VOTE KIDS!

Dear Readers,

We have some great news for authors and readers. Articles published in your Journal are now searchable on Google Scholar, starting with the previous edition of the Journal. All future issues will be searchable in Google Scholar, and we will be adding previous issues over the next several months. This is one of the first steps towards our goal of getting our journal indexed with the National Library of Medicine, and we aim to have all editions available on PubMed. I want to thank our Editorial Board and Chapter Staff, especially John Horne, who helped us make this next step possible. We have a lot of work to be done and we will need your assistance. Until this point, all the articles were being reviewed by Editorial Board members. To have a better chance for indexing on PubMed, we will need a group of individuals from amongst our members who are not Editorial Board members to review manuscripts. Over the next few weeks, our Editorial Board members will be contacting you to help us review manuscripts. We hope to have a cadre of specialist and generalist pediatricians to help us review manuscripts. We appreciate your assistance and thank you in anticipation.

Many medical issues that are important for children. Parechovirus infections. Monkeypox. COVID BA.5 subvariant. However, this time I am going to focus on other equally (if not more) important issues affecting children in Florida.

We are in that time for our Chapter where every two years we have elections to choose the leadership of the chapters. Elections just happened and I hope that everyone used their privilege to elect chapter leadership for the next two years. We want to thank the leaders who are rotating off. Special thanks to our own Editorial Board member Paul Robinson, who completed his service in the most remarkable manner and will be rotating off the Executive Committee. I am certain that Paul will continue to serve the Chapter and children with the same enthusiasm as he did while on the Executive Committee.

There has been a lot of news regarding healthcare of children in Florida, and, frankly, some of it has not been good for children. Now, more than ever, we need each and everyone of us to stand up for the rights of children. To protect our children, we need your advocacy in Tallahassee and in your communities. You can do this by educating your elected officials about critical issues impacting the health and wellbeing of children. We have important elections happening this year and next year. Please get active in the political process. Form alliances with other groups advocating for children. Find common ground with groups whose advocacy issues also impact children, like those advocating for climate change issues, preventing homelessness, fighting hunger, decreasing firearm injury, and reducing poverty. All these issues impact children. Ask candidates about their position on issues affecting children, educate them about what is important for the wellbeing of children, and why the candidate should support children's issues. Then support child-friendly candidates with your wallet and at the ballot box. In short: **VOTE KIDS!**

Mobeen H. Rathore, MD, CPE, FAAP, FPIDS, FSHEA, FIDSA, FACPE
Editor, The Florida Pediatrician

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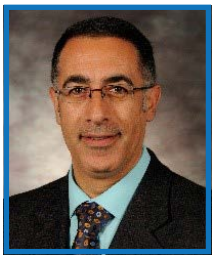

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CASE REPORT

A Teenage Male With Sore Throat and Fever

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ABSTRACT

Acute promyelocytic leukemia (APL) is a subtype of acute myeloid leukemia (AML) characterized by t(15;17) with formation of the PML-RARA fusion gene. APL most commonly presents with complications of pancytopenia including fatigue, weakness, infections, and bleeding. An ominous feature of APL is its predilection for disseminated intravascular coagulation (DIC). This case introduces pharyngitis and pharyngeal asymmetry as presenting features of APL in a 19-year-old male.

CASE PRESENTATION

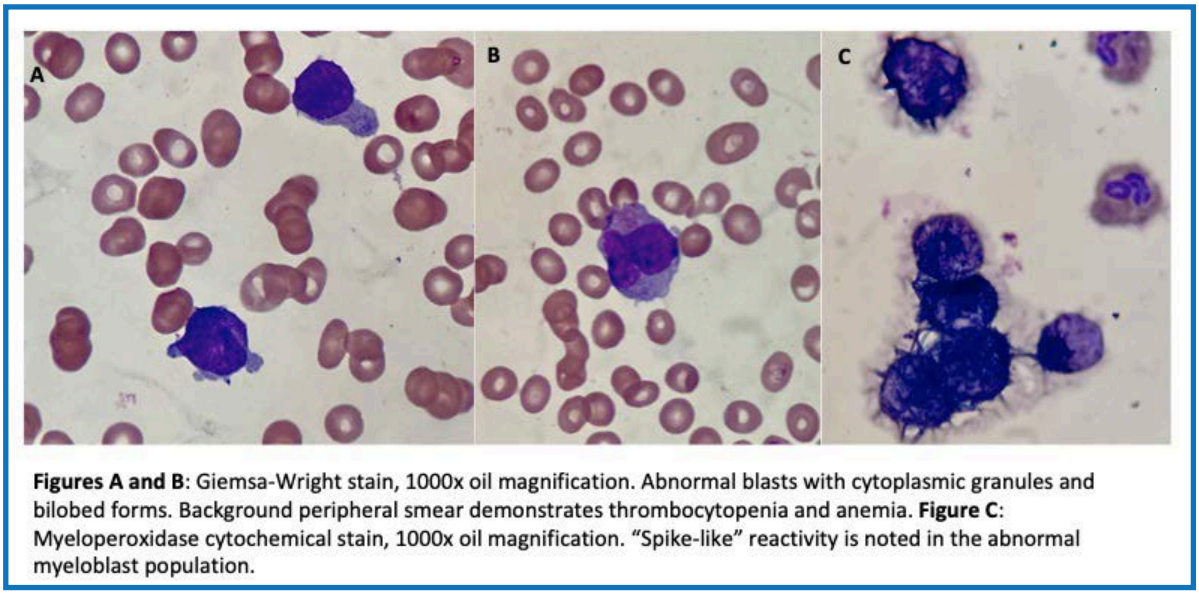
A 19-year-old immunized black male with history of attention deficit hyperactivity disorder presented to his primary care physician (PCP) for evaluation of sore throat, trismus, and dysphagia of three days duration. The patient was afebrile at the time of evaluation and the rest of his vital signs were normal for age. On exam, the patient's right tonsil was noted to be slightly larger than the left tonsil. There was no other palatal asymmetry or uvular deviation. Rapid Strep and SARS-CoV-2 polymerase chain reaction tests were negative. A throat culture was sent which later showed no growth.

Supportive care and return precautions were discussed. He returned to his PCP two days later for evaluation of worsening sore throat, voice deepening, and fever to 38°C. The patient also noted gingival bleeding with teeth brushing over the preceding week. Upon reexamination, there was marked posterior pharyngeal erythema and the right tonsil was significantly larger than the left tonsil. The uvula appeared edematous and obscured a large portion of the patient's airway. Right mandibular swelling and right tender submandibular lymphadenopathy were noted.

LABORATORY STUDIES AND IMAGING

The patient was referred to the emergency department (ED) for evaluation of suspected right peritonsillar abscess with concern for airway compromise. Neck computed tomography (CT) scan in the ED was significant for profound uvular, tonsillar, supraglottic, epiglottic, and retropharyngeal edema with right-sided reactive lymphadenitis. No abscess or drainable fluid collection was visualized.

Initial laboratory workup revealed negative mononucleosis screen and pronounced pancytopenia with hemoglobin 5.6 g/dL (normal reference: 13-16.5), hematocrit 15.8% (normal reference: 39-49%), and platelets 11x10^3/µL (normal reference: 150-450). There was marked leukopenia to 3.5x10^3/µL (normal reference: 4-10) with neutropenia to 3% (normal reference: 40-80%) and 71% blast cells. Peripheral smear confirmed numerous blast cells and revealed promyelocytes with abundant cytoplasmic granules and occasional bilobed nuclei, consistent with a diagnosis of acute promyelocytic leukemia (APL) (Figure 1).



Figures A and B: Giemsa-Wright stain, 1000x oil magnification. Abnormal blasts with cytoplasmic granules and bilobed forms. Background peripheral smear demonstrates thrombocytopenia and anemia. **Figure C**: Myeloperoxidase cytochemical stain, 1000x oil magnification. "Spike-like" reactivity is noted in the abnormal myeloblast population.

Figure 1: Peripheral smear with characteristic findings of acute promyelocytic leukemia (APL).

HOSPITAL COURSE

The patient was admitted to the pediatric oncology service and began differentiation therapy with all *trans*-retinoic acid (ATRA) and arsenic per AAML1331 protocol. He was also started on cefepime for febrile neutropenia and received two units of packed red blood cells and two units of platelets for anemia and thrombocytopenia, respectively. Fluorescence in situ hybridization analysis later demonstrated the characteristic APL PML-RARA fusion gene formed by t(15q;17q).

Approximately fourteen hours after admission, the patient complained of a headache and worsening throat pain. Upon evaluation, he was diaphoretic, with an unsteady gait and erratic eye movements. He also exhibited fluctuating mental status, at times responding only to painful stimuli. Elevated blood pressures and bradycardia raised clinical suspicion for increased intracranial pressure. Due to concern for brainstem herniation, the patient received hypertonic saline and mannitol. Glasgow Coma Scale score declined from 12 to 8, and the decision was made to intubate. Due to significant airway edema and oozing of blood, the patient was intubated on the fifth attempt by Pediatric Anesthesia. STAT head CT after securing of the airway revealed an acute left cerebellar hemorrhage with blood in the fourth ventricle, as well as upward transtentorial herniation, left tonsillar herniation, and obstructive hydrocephalus (Figure 2). Pediatric Neurosurgery was consulted but did not pursue surgical intervention in the setting of presumed disseminated intravascular coagulation (DIC). The suspicion for acute DIC was evidenced by worsening elevation in prothrombin time (PT) to 19.3 sec (normal reference: 9.1-13.5) and international normalized ratio (INR) of 1.6 (normal reference: 0.8-1.1), elevated D-dimer, low fibrinogen, and continued anemia and thrombocytopenia despite repeat transfusions. The cerebral edema ultimately improved with medical therapy, and the patient was extubated on the fourth day of hospitalization.

DISCUSSION

Acute promyelocytic leukemia (APL) is a variant of acute myeloid leukemia (AML) formerly described as AML-M3 that has an incidence of 0.27 per 100,000 people in the United States and accounts for an estimated 10-15% of adult AML cases.[1, 2] Within the U.S., APL most commonly affects whites, Hispanics, and Asians, with a lower incidence among blacks.[3] There is no sexual predilection.[3]

APL has a high rate of early morbidity and mortality due to severe hemorrhage in the setting of pancytopenia, enhanced fibrinolysis, and a proclivity for DIC.[4] The incidence of early mortality is approximately 20%.[5] The majority of patients present

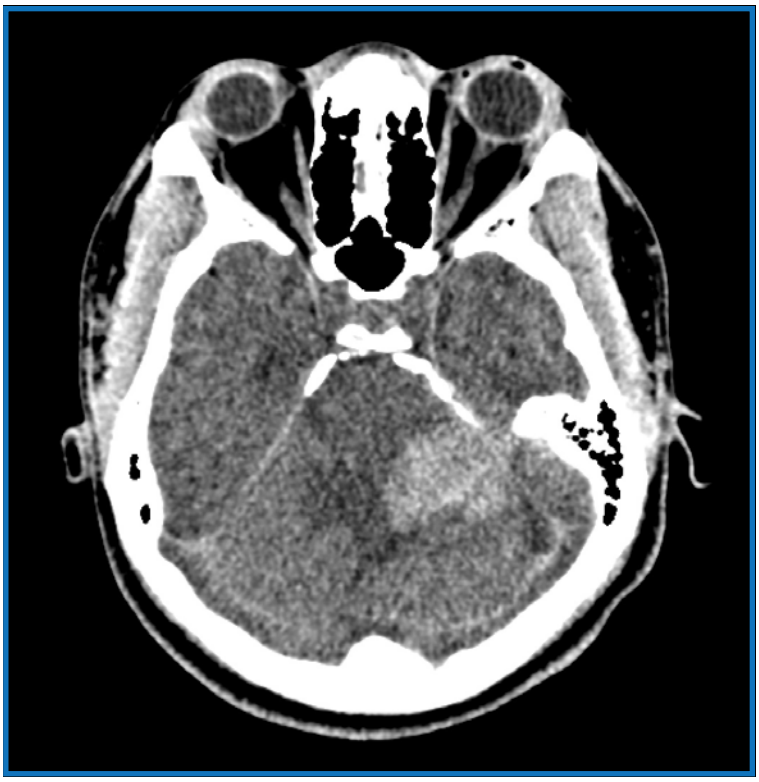


Figure 2: Acute left cerebellar hemorrhage on head CT.

with complications of pancytopenia, including fatigue due to anemia, infection due to neutropenia, and ecchymosis, epistaxis, gingival bleeding, or menorrhagia due to thrombocytopenia.

This case describes an unusual presentation of APL. Sore throat is a common complaint in the pediatric clinic and rarely prompts clinicians to investigate beyond initial swabs and point-of-care tests. In this patient with pharyngitis and pharyngeal asymmetry, peritonsillar abscess was initially suspected. It was only after obtaining further labs and imaging that malignancy entered the differential diagnosis. This case also emphasizes the importance of a detailed history, as knowledge of the patient's easy bleeding is suggestive of a more complex process than acute infection alone.

A propensity for bleeding is common with APL, and the patient in this case developed a severe intracranial hemorrhage with resultant tonsillar herniation secondary to DIC. Despite initiation of early treatment with ATRA, the risk of hemorrhage remains high and must be monitored for carefully. His cerebellar hemorrhage-induced cerebral edema was managed medically due to thrombocytopenia and coagulopathy precluding surgical intervention.

TREATMENT AND OUTCOME

The patient was treated with ATRA and arsenic. He is currently continuing treatment in the outpatient setting and has no residual neurological deficits.

REFERENCES

1. Chen Y, Kantarjian H, Wang H, et al. Acute Promyelocytic Leukemia: A Population-Based Study on Incidence and Survival in the United States, 1975-2008. *Cancer*. 2012; 118(23):5811-5818.
2. Soignet S, Maslak P, Wang Z, et al. Complete Remission after Treatment of Acute Promyelocytic Leukemia with Arsenic Trioxide. *N Engl J Med*. 1998; 339:1341-1348.
3. Matasar M, Ritchie E, Consedine N, et al. Incidence rates of acute promyelocytic leukemia among Hispanics, blacks, Asians, and non-Hispanic whites in the United States. *Eur J Cancer Prev*. 2006; 15(4):367-370.
4. Ravandi F, Stone R. Acute Promyelocytic Leukemia: A Perspective. *Clin Lymph Myel Leuk*. 2017; 17(9):543-544.
5. Park J, Qiao B, Panageas K, et al. Early death rate in acute promyelocytic leukemia remains high despite all-*trans* retinoic acid. *Blood*. 2011; 118(5):1248-1254.

RESIDENT ARTICLE

Relationship Between Depression and Blood Pressure and Pulse Rate in an Adolescent Clinic

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ABSTRACT

Background

Depression is a risk factor for adult cardiovascular mortality with unclear pathophysiology. The literature on physiologic parameters related to depression is inconsistent and scant in adolescent patients.

Aim of the study

The purpose of this study is to determine if there is a relationship between depression and physiologic parameters including blood pressure (BP) and pulse rate (PR) in adolescents.

Methods

Adolescents with and without depression were compared to controls without depression for systolic BP, diastolic and PR using a two-way type III ANOVA.

Results

In depressed patients, there was significantly higher systolic BP percentiles (57.4 depressed versus 47.8 non-depressed; F (DF 1) = 4.48, p = 0.036), no difference in diastolic BP, and significantly higher PR in depressed males but not females (males depressed 86.7 vs. 72.1; F (DF 1) = 8.61, p =0.003).

Conclusion

Significantly higher systolic blood pressure percentiles in depressed patients vs. non-depressed patients and significantly higher pulse rates in depressed males but not females were found. These findings may lead to a greater understanding of the physiologic correlates of depressive psychopathology that have implications for subsequent development of cardiovascular disease.

Keywords: Hypertension, Heart rate, Adolescents, Depression

INTRODUCTION

Psychiatric disorders are associated with pathological, physiologic, or subclinical evidence of accelerated atherosclerosis.[1],[2,3] Anxiety and depression, has been associated with an increased risk of cardiovascular disease.[2,4-8] Evidence suggests that the risk of mortality is increased in patients with coronary artery disease who have comorbid depression.[9,10]

Major Depressive Disorder and Bipolar Disorder have been categorized as tier II (moderate) cardiovascular disease risk factors by the American Heart Association.[11] Further study of the relationship between psychiatric diseases and cardiovascular disease (CVD) risk factors in children and adolescents is needed.

Mental health problems affect pathophysiological pathways with increased oxidative stress, inflammation, and autonomic dysfunction.[12] Oxidative stress is related to the progression of CVD and, is also frequently increased in patients with psychopathology.[11] Inflammation, an established known factor in the pathogenesis of CVD, was also found to have a bidirectional relationship with depression and childhood adversity.[11,13] Also, depressed patients were found to have worse autonomic function compared to those without depression, and it is thought that dysfunction may result in many long-term complications, such as hypertension in young individuals.[14] Therefore, the combined long-term effect of these different pathophysiological changes is hypothesized to enhance the progression of CVD in patients with psychopathology.[11]

Hypertension is a significant risk factor for CVD,[15] and evidence suggests that it could be more common among patients with psychopathology.[16] Therefore, hypertension could explain part of the long-known association between psychopathology and CVD.[17] Studies investigating the association between BP and anxiety and depression have had inconsistent results ranging from a positive association,[18] a negative association,[19] or even a nonexistent association.[20] The same level of controversy with even more scarce studies is found in the adolescent population.[21]

Looking at sex differences, most of the studies showed that the blood pressure had no significant sex differences in association with depression, despite higher scores of depression in women and higher blood pressure in men.[19] One study showed that the relation between blood pressure and depression was only in boys.[22] Additionally, the Baltimore Longitudinal Study of Ageing showed lower blood pressure in men with depression, but the inverse relationship in younger women.[23]

The purpose of this study is to further analyze the relationship between depression and BP or P in adolescents. The hypothesis is depression will be related to higher BP and PR.

METHODS

Prior to data collection, approval was obtained from the Sacred Heart Hospital Institutional Review Board (IRB).

Inclusion criteria: This case-control study included patients over age of 13 years, who attended an Adolescent Medicine outpatient residency teaching clinic. Patients who were diagnosed with a depressive disorder were compared to a control group without a depressive diagnosis for systolic and diastolic BP percentiles (derived from CDC age and sex data) and pulse rates. The patients attended the clinic for various reasons including well child visits, sports physical exam, visits for acute medical or mental health problems. Patients from both groups were randomly selected from a three-year period 12/2015 to 12/2018. Diagnosis of depression was made by the same board-certified Adolescent Medicine subspecialist using the Diagnostic and Statistics Manual of Mental Disorder (DSM-V) criteria based on direct interview and assessment of function and distress with information provided by the Patient Health Questionnaire-9 (PHQ-9) score. Since this was a retrospective chart review, ID-10 diagnostic codes F32.0-F32.9, F33.0-F33.9 were used for search of depressed teens. Controls were those who did not have these codes.

Exclusion criteria: Charts that did not contain the following study data were not included: Subject demographics (age, race, sex), subject vital signs- heart rate, blood pressure, height/weight, BMI, concurrent diagnoses (medical and psychiatric).

A two-way type III ANOVA using normal scores transformed variables was used to analyze systolic and diastolic BP percentiles and pulse rates as dependent variables and sex (male/female), and depression status (depressed/non-depressed) entered as fixed factors. Transforming all data to normal quantiles or normal scores makes the tests nonparametric and less sensitive to any existing outliers in the data that may affect the outcomes.

RESULTS

There were 146 patients, 58 (39.7%) with depression and 88 (60.3%) without the depression diagnosis (control group). There

Variable	
N	146
Age (mean, S.D.)	16.24 (1.70)
Pulse (mean, S.D.)	80.49 (16.16)
Systolic percentile (mean, S.D.)	0.52 (0.030)
Diastolic percentile (mean, S.D.)	0.60 (0.25)
Sex	
Male (n, %)	72 (49.7%)
Female (n, %)	73 (50.3%)
Race	
White (n, %)	73 (52.1%)
Black (n, %)	58 (41.4%)
Other (Asian, Hispanic) (n, %)	9 (6.4%)
Depression status	
Depressed (n, %)	58 (39.7)
Not Depressed (n, %)	88 (60.3)

Table 1: Descriptive statistics

Variable	Depressed	Non-Depressed	p value
Sex			
Male	16 (22.8%)	56 (77.8%)	Chi-square 18.83
Female	42 (57.5%)	31 (42.5%)	p<0.001
Mean age	16.24 (S.D. 1.76)	16.25 (S.D. 1.76)	NS
Race			
White	41 (56.2%)	32 (43.8%)	
Black	10 (17.2%)	48 (82.8%)	Chi-square 20.6
Other (Asian, Hispanic)	4 (44.4%)	5 (55.6%)	P<0.001

Table 2: Descriptive statistics by depression status

were equal numbers of male and female patients with a mean age of 16.2 years (Table 1).

In our study population, there were 16 (22.8%) of male adolescents vs. 42 (57.5%) of female adolescents categorized as depressed (Chi-square 18.83, p <0.001); mean age was the same for depressed adolescents vs. not depressed at 16.2 years and 44 (55.7%) of white adolescents, 10 (17.2%) of black adolescents and 4 (44.4%) of other (Asian, Hispanic, other) were in the depressed category (Chi-square 20.6, p<0.001) (Table 2).

On two-way type III ANOVA using transformed variables, there were significantly higher systolic blood pressure percentiles in depressed patients vs. non-depressed (57.4 vs. 47.8; F (DF 1) = 4.48, p = .030. There was no main effect of depression on diastolic blood pressure and there was no interaction effect of sex and depression (Table 3).

Finally, there was a significant interaction effect of depression and sex on pulse rate so that higher mean Pulse Rates were found in depression only among males but not females. (males depressed mean PR was 86.7 vs. males non-depressed PR of 72.1; F (DF 1) = 8.61, p =.003) (Figure 1a and Figure 1b). The statistical power (of the interaction test sex by depressed) for the only significant variable pulse, was found to be 85% using G*power.

	Depressed	Non-Depressed	p-value
Mean Systolic percentile	57.43 (S.D. 32.30)	47.84 (S.D. 28.20)	F= 4.48, p=.030
Mean Diastolic	60.57 (S.D. 28.46)	58.94 (S.D. 23.21)	NS

Table 3: Comparison of Mean BP percentiles: Non-Depressed vs. Depressed (Two-way type III ANOVA). No significant interaction effect between Depression and Sex.

A separate analysis was conducted addressing the potential influence of obesity and race on HR and BP percentiles and were not found to be statistically different between depressed vs. non-depressed groups.

DISCUSSION

Studies investigating the association between BP and depression have had inconsistent results ranging from a positive association[18], a negative association[19], or even a nonexistent association.[24]

In this study, significantly higher systolic blood pressure percentiles were found in depressed patients vs. non-depressed with no significant effect of depression on diastolic blood pressure. Our findings are in accordance with data from the British Whitehall II Study, suggesting that the risk of hypertension increased with repeated experience of depressive symptoms over time.[7] The strength of that study includes the use of five waves of screening data of depressive symptoms and blood pressure, however, the patients' ages ranged from 35 to 55 at baseline, and the findings were not significant in women.[25]

One of the proposed mechanisms for the association between hypertension and psychopathology is genetic susceptibility. It is widely accepted that genetics plays a significant role in the susceptibility to hypertension.[26] It is also suggested that genetic factors play an important role in the pathophysiology of mood disorders.[27]

Other studies did not find the association between higher BP in depressed patients. Hildrum et al., found BP was lower in patients with depression.[28] This finding was supported by subsequent longitudinal research (HUNT study) on the same population, even when those on medications for depression or hypertension were excluded.[19] Of the proposed mechanisms to explain this association is a causative role for hypotension in the pathogenesis of depression through somatic symptoms and fatigue. A physiologic explanation for this association is that the central monoamine system may mediate hypotension and depression. In this system, altered levels of neuropeptide Y are thought to suppress sympathetic activity leading to a decrease in BP with depression.[29]

Such results are intriguing and contradict the hypothesis that hypertension plays a role in the association between psychopathology and CVD as mentioned earlier.[17] These disparate findings are unexplained, but may involve differences in study populations. For example, comparing the HUNT study to the Whitehall study, the latter had a much higher proportion of nonwhite participants in which they reported higher odds for hypertension.[19] Conflicting results could also be due to the different ways of defining hypertension as some studies have used self-reported hypertension instead of measuring blood pressure[30], short periods of follow up[20], different age groups studied[30], or not accounting for confounding factors such as the use of antidepressants.[20]

Few studies pertain to adolescents. One of these is the Western Australian Pregnancy Cohort (Raine) Study, where an inverse association between depression and blood pressure was found in 14-year-old boys.[22] This is in agreement with another prospective 20-year cohort study.[21] To add to the confusion, Hammerton and coworkers[31] found that lower systolic blood pressure could predict new-onset depressive disorders in high-risk children (offspring of mothers experiencing recurrent depression), but they also found that adolescents from the general population with higher blood pressure showed a higher risk of development of future depressive disorders.

Differences between studies could be explained by the differences in the study populations, population age, antidepressant or antihypertensive treatment, different means of assessing depression, and blood pressure recording methods. In our study, a significantly higher pulse rate was found in depressed males but not depressed female adolescents. This is a novel finding. A high heart rate has been associated with an increased risk of future CVD in the general population[32] and is also found in patients with established CVD.[33] It is hypothesized but still unclear whether the increased resting pulse rate plays a role in the association between CVD and psychopathology.[34] Our results are in accordance with the FINE study where higher heart rate was found to correlate with depression in elderly men but was found not to cause subsequent cardiac events.[34] However, the HUNT study reported only a weak cross-sectional association between depression and increased pulse rate.[19] It is likely that complex interactions of environmental stressors and resulting physiologic responses may mediate this phenomenon.

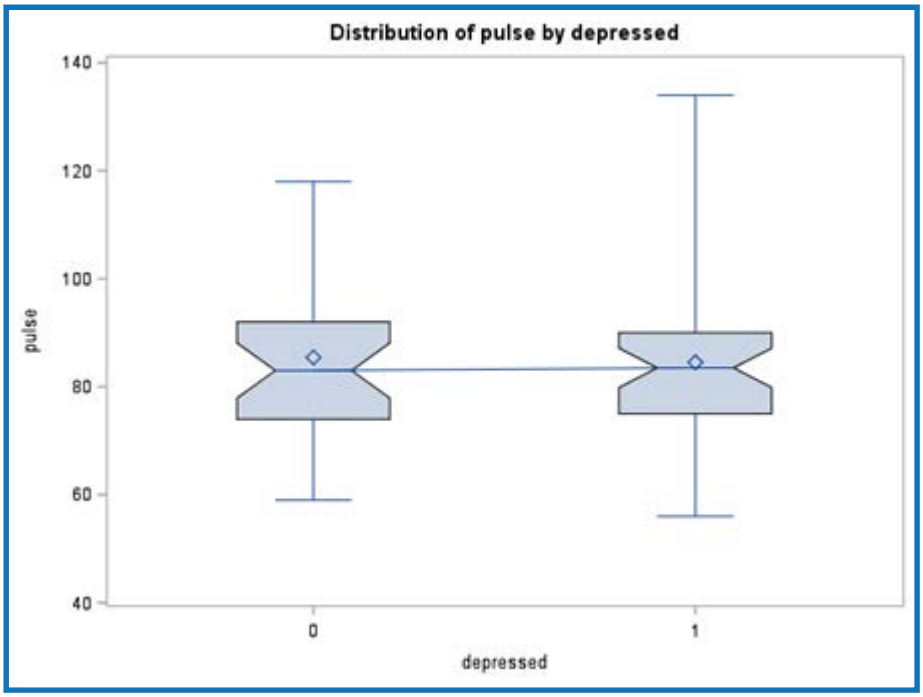

Figure 1 a. Distribution of pulse in females by depression status (NS)

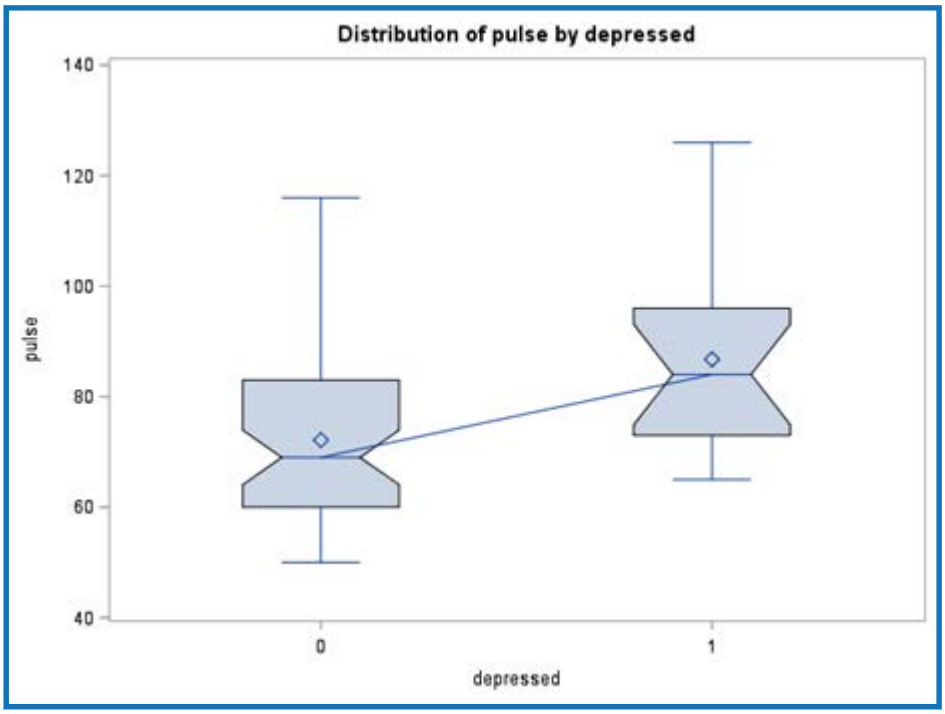

Figure 1 b. Distribution of pulse in males by depression status (p=.003)

The strengths of the current study included the study of adolescents which is an age that has not been well studied regarding depression and physiologic parameters. Blood pressure percentiles for age, height, and sex were used which is a more valid variable for analysis. The diagnosis of depression in this study was made by one board certified Adolescent Medicine subspecialist adding consistency and is derived from clinical data. The significantly higher depression rates among females versus males and in white versus other races (Table 2) in our clinic sample, represents the nature of our clinic and the population that it serves.

There are limitations of this study including the retrospective, case-control study design, and measuring data at one point in time with no long-term follow up. This is a preliminary study in a small group of patients attending an adolescent clinic.

Also, data to control for potential confounding variables known to cause secondary hypertension or elevated PR in children such as renal disease, cardiac disease, endocrine disorders, and certain medications was not included in the analysis nor was family history of hypertension included. Also, the reason for this visit was not included as a potential confounding variable. Other limitations are that this study was conducted in a single clinic which limits generalizability and that BP was measured with a single automated sphygmomanometer measurement and not a continuous ambulatory method.

CONCLUSION

Significantly higher systolic blood pressure percentiles were found in depressed vs. non-depressed adolescents. Pulse rates were higher in males who were depressed vs. non-depressed but this relationship was not seen in females. Future expanded study of these findings is warranted.

REFERENCES

1. Tiemeier H, van Dijck W, Hofman A, Witteman JC, Stijnen T, Breteler MM. Relationship between atherosclerosis and late-life depression: the Rotterdam Study. *Arch Gen Psychiatry*. 2004;61(4):369-376.
2. Ballenger JC, Davidson JR, Lecrubier Y, Nutt DJ, Roose SP, Sheps DS. Consensus statement on depression, anxiety, and cardiovascular disease. *J Clin Psychiatry*. 2001;62 Suppl 8:24-27.
3. Masters KS, Shaffer JA, Vagnini KM. The Impact of Psychological Functioning on Cardiovascular Disease. *Curr Atheroscler Rep*. 2020;22(10):51.
4. Bordoni B, Marelli F, Morabito B, Sacconi B. Depression and anxiety in patients with chronic heart failure. *Future Cardiol*. 2018;14(2):115-119.
5. Cohen BE, Edmondson D, Kronish IM. State of the Art Review: Depression, Stress, Anxiety, and Cardiovascular Disease. *Am J Hypertens*. 2015;28(11):1295-1302.
6. Hare DL, Toukhsati SR, Johansson P, Jaarsma T. Depression and cardiovascular disease: a clinical review. *Eur Heart J*. 2014;35(21):1365-1372.
7. Penninx BW. Depression and cardiovascular disease: Epidemiological evidence on their linking mechanisms. *Neurosci Biobehav Rev*. 2017;74(Pt B):277-286.
8. Seldenrijk A, Vogelzangs N, Batelaan NM, Wieman I, van Schaik DJ, Penninx BJ. Depression, anxiety and 6-year risk of cardiovascular disease. *J Psychosom Res*. 2015;78(2):123-129.
9. Barth J, Schumacher M, Herrmann-Lingen C. Depression as a risk factor for mortality in patients with coronary heart disease: a meta-analysis. *Psychosom Med*. 2004;66(6):802-813.
10. Silverman AL, Herzog AA, Silverman DI. Hearts and Minds: Stress, Anxiety, and Depression: Unsung Risk Factors for Cardiovascular Disease. *Cardiol Rev*. 2019;27(4):202-207.
11. Goldstein BI, Carnethon MR, Matthews KA, McIntyre RS, Miller GE, Raghuveer G, et al. Major Depressive Disorder and Bipolar Disorder Predispose Youth to Accelerated Atherosclerosis and Early Cardiovascular Disease: A Scientific Statement From the American Heart Association. *Circulation*. 2015;132(10):965-986.
12. Palta P, Samuel LJ, Miller ER, Szanton SL. Depression and oxidative stress: results from a meta-analysis of observational studies. *Psychosom Med*. 2014;76(1):12-19.
13. Miller GE, Cole SW. Clustering of depression and inflammation in adolescents previously exposed to childhood adversity. *Biol Psychiatry*. 2012;72(1):34-40.

14. Ryder JR, O'Connell M, Bosch TA, Chow L, Rudser KD, Dengel DR, et al. Impaired cardiac autonomic nervous system function is associated with pediatric hypertension independent of adiposity. *Pediatr Res*. 2016;79(1-1):49-54.
15. Stokes J, Kannel WB, Wolf PA, D'Agostino RB, Cupples LA. Blood pressure as a risk factor for cardiovascular disease. The Framingham Study--30 years of follow-up. *Hypertension*. 1989;13(5 Suppl):I13-18.
16. Carroll D, Smith GD, Shipley MJ, Steptoe A, Brunner EJ, Marmot MG. Blood pressure reactions to acute psychological stress and future blood pressure status: a 10-year follow-up of men in the Whitehall II study. *Psychosom Med*. 2001;63(5):737-743.
17. Scuteri A. Depression and cardiovascular risk: does blood pressure play a role? *J Hypertens*. 2008;26(9):1738-1739.
18. Jani BD, Cavanagh J, Barry SJ, Der G, Sattar N, Mair FS. Relationship Between Blood Pressure Values, Depressive Symptoms, and Cardiovascular Outcomes in Patients With Cardiometabolic Disease. *J Clin Hypertens (Greenwich)*. 2016;18(10):1027-1035.
19. Hildrum B, Romild U, Holmen J. Anxiety and depression lowers blood pressure: 22-year follow-up of the population based HUNT study, Norway. *BMC Public Health*. 2011;11:601.
20. Delaney JA, Oddson BE, Kramer H, Shea S, Psaty BM, McClelland RL. Baseline depressive symptoms are not associated with clinically important levels of incident hypertension during two years of follow-up: the multi-ethnic study of atherosclerosis. *Hypertension*. 2010;55(2):408-414.
21. Bhat SK, Beilin LJ, Robinson M, Burrows S, Mori TA. Relationships between depression and anxiety symptoms scores and blood pressure in young adults. *J Hypertens*. 2017;35(10):1983-1991.
22. Louise S, Warrington NM, McCaskie PA, Oddy WH, Zubrick SR, Hands B, et al. Associations between anxious-depressed symptoms and cardiovascular risk factors in a longitudinal childhood study. *Prev Med*. 2012;54(5):345-350.
23. Shah MT, Zonderman AB, Waldstein SR. Sex and age differences in the relation of depressive symptoms with blood pressure. *Am J Hypertens*. 2013;26(12):1413-1420.
24. Grimsrud A, Stein DJ, Seedat S, Williams D, Myer L. The association between hypertension and depression and anxiety disorders: results from a nationally-representative sample of South African adults. *PLoS One*. 2009;4(5):e5552.
25. Nabi H, Chastang JF, Lefèvre T, Dugravot A, Melchior M, Marmot MG, et al. Trajectories of depressive episodes and hypertension over 24 years: the Whitehall II prospective cohort study. *Hypertension*. 2011;57(4):710-716.
26. Grewen KM, Girdler SS, Hinderliter A, Light KC. Depressive symptoms are related to higher ambulatory blood pressure in people with a family history of hypertension. *Psychosom Med*. 2004;66(1):9-16.
27. Nurnberger JI, McInnis M, Reich W, Kastelic E, Wilcox HC, Glowinski A, et al. A high-risk study of bipolar disorder. Childhood clinical phenotypes as precursors of major mood disorders. *Arch Gen Psychiatry*. 2011;68(10):1012-1020.
28. Hildrum B, Mykletun A, Stordal E, Bjelland I, Dahl AA, Holmen J. Association of low blood pressure with anxiety and depression: the Nord-Trøndelag Health Study. *J Epidemiol Community Health*. 2007;61(1):53-58.
29. Head GA. Central monoamine neurons and cardiovascular control. *Kidney Int Suppl*. 1992;37:S8-13.
30. Gangwisch JE, Malaspina D, Posner K, Babiss LA, Heymsfield SB, Turner JB, et al. Insomnia and sleep duration as mediators of the relationship between depression and hypertension incidence. *Am J Hypertens*. 2010;23(1):62-69.
31. Hammerton G, Harold G, Thapar A. Depression and blood pressure in high-risk children and adolescents: an investigation using two longitudinal cohorts. *BMJ Open*. 2013;3(9):e003206.
32. Tverdal A, Hjellvik V, Selmer R. Heart rate and mortality from cardiovascular causes: a 12 year follow-up study of 379,843 men and women aged 40-45 years. *Eur Heart J*. 2008;29(22):2772-2781.
33. Fox K, Ford I, Steg PG, Tendera M, Robertson M, Ferrari R, et al. Heart rate as a prognostic risk factor in patients with coronary artery disease and left-ventricular systolic dysfunction (BEAUTIFUL): a subgroup analysis of a randomised controlled trial. *Lancet*. 2008;372(9641):817-821.
34. Kamphuis MH, Geerlings MI, Dekker JM, Giampaoli S, Nissinen A, Grobbee DE, et al. Autonomic dysfunction: a link between depression and cardiovascular mortality? The FINE Study. *Eur J Cardiovasc Prev Rehabil*. 2007;14(6):796-802.

RESIDENT ARTICLE

Promoting Literacy and Developmental Milestones: Teaching Primary Care Pediatricians via the Reach Out and Read Program Model

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ABSTRACT

Pediatricians are tasked with the responsibility to educate families and children during annual well-child visits about the importance of literacy as a key part of development. The American Academy of Pediatrics strongly supports the promotion of early literacy. Developing early literacy stimulates optimal patterns of brain development and strengthens parent-child relationships that in turn builds language, literacy, and social-emotional skills. Reach out and Read is a national nonprofit organization that promotes the use of books during well-child visits for children age 6 months and 6 years to encourage families to read together. In our resident pediatric clinic, we strive to utilize this model with our families. In addition to promoting early literacy, we have found that this program offers the unique opportunity to allow resident physicians first-hand education on developmental milestones in pediatric patients.

INTRODUCTION

It has been reported that only 12% of US adults have proficient health literacy.[1,2] As pediatricians, we are tasked with the responsibility to educate families and children during their well-child visits about the importance of literacy as part of their development, as it sets a foundation for their child's development and vocabulary. In addition to developing speech, it also promotes social development, fine and gross motor skills. The American Academy of Pediatrics (AAP) strongly supports the promotion of early literacy.[3] This is accomplished in manners such as reading regularly with young children. These activities then stimulate optimal patterns of brain development and strengthen parent-child relationships that, in turn, build language,

literacy, and social-emotional skills.[3] The objective of the Reach out and Read (ROAR) model is to work with pediatric primary care providers to maximize children's development by incorporating books and encouraging families to read out loud, with a focus to start as early as infancy.[4]

Our pediatric residents participate in the ROAR model in their continuity clinic by distributing age-appropriate books to all children between 6 months and 5 years of age during their well-child visits.[4] At these visits, we educate parents about the importance of early childhood literacy. As the infants grow, we teach parents how to adapt the reading time activity to the child's age. For example, parents learn to let toddlers point to the pictures, flip the pages, squat to pick up the book, and tell a story from the pictures before learning sight words.

The ROAR model allows physicians to support parents in reading to their children. For residents, it also encourages them to learn and evaluate developmental milestones. Residents are taught about the program at the start of each academic year by the senior resident on the project during a dedicated morning report. This includes an explanation of what the program is and examples of how to best use the books for infants and toddlers. Residents continue to learn about developmental milestones through clinical teaching and hands-on experience throughout the year. When a resident physician provides a parent and child a book, the resident physician is to teach them how to properly use it as appropriate for the child's age. For instance, they are to explain to the parent that at 6 months the infant will grab the book and transfer it from hand-to-hand. It is explained to the family that hardcover books are recommended as infants may explore by putting the book in their mouthes. Alternatively, the resident would discuss with the parents of an 18-month-old the ability of the toddler to squat or pick out the book they wish to read or their ability to point to the pictures as the family reads together. Additionally, each patient room has a laminated pamphlet for parents to browse through while residents are speaking with their attendings. The pamphlet contains examples of how to best utilize the book based on their child's age. This helps reinforce resident knowledge and parental understanding.

METHODS

In 2019, a Quality Improvement (QI) initiative was developed to better understand the utility of the ROAR program in encouraging parents to read to their children. An anonymous survey was given to parents with children 6 months to 5 months of age who had come for a well-child check. The survey specifically measured if the parents were reading to their children prior to their well-child visit, if they took time to read after seeing their physician, and if they have heard about Reach Out and Read. Data was collected over a 5-month period.

RESULTS

From the survey responses, it was found that approximately 89% of surveyed parents read to their children prior to the well-child visit, 43% of parents read more to their children after receiving a book, and 61% of parents do not remember being told about ROAR. While many parents were already reading to their children, there was a reported increase in reading following having received a ROAR book. Despite this, only 39% recalled learning about the ROAR when they received a book during their appointment.

A review of the data from the initial QI showed that one possible reason that there was a low recollection of ROAR by families is that residents were not dedicating time to discuss it with the families as well as maximizing its potential as a learning tool. Therefore, we implemented a phase to promote literacy and improve physicians' compliance to teach and use the model during their clinic. At the start of this phase, a survey of all resident physicians was sent out. The survey showed that half of the residents gave books to their patients, but only 14% used the laminated pamphlets to talk about the milestones. Overall, 63% of residents polled said that if they were provided a reminder for each visit, then they would be more likely to practice their milestones.

As a result of the survey, we realized residents were not as adherent to the ROAR model as desired, and a multi-pronged approach was initiated to increase participation. Initially, teaching was provided to all residents via a formal presentation on how each age group will benefit from a book and what they should see that specific age do with a book. Secondly, we implemented reminders on all physician computers. A laminated note was taped on the bottom of the screens reminding all physicians before going into a patient room: "Did you hand out a BOOK and discuss milestones?" Thirdly, note templates were addended for well child visits aged 6 months to 6 years to document whether or not ROAR was discussed during the visit.

After the implementation of these changes, there was a significant improvement in the number of residents who reported adherence to the program. Qualitatively, residents have commented on the appreciation of the small reminders to ensure their patients are able to participate in ROAR. Post surveys show 90% of providers agree that the laminated sheets next to their computer is a helpful reminder. There has been a transition that 33% are using the laminated pamphlets in the room based on

age to give to parents to read while they are waiting for the physician to come back with the supervising attending. Around 90% of residents are currently using the books to teach families and practice their developmental milestones (up from 14%). Overall, with time and the implemented changes, we hope to see continued improvement of each resident remembering to bring in a book and discuss developmental milestones during their time with their patient and families.

DISCUSSION

Early children's literacy is a key foundation to childhood development. Primary care pediatricians are uniquely positioned to be able to help promote literacy and early development. Through ROAR, physicians make a difference by taking the time to share how to best use a book to help develop skills through multiple developmental domains. In doing so, we are not only able to assist families, but also use this as a teaching tool for resident physicians. Residents are able to use such a source to learn and practice their developmental milestones during their training. Through this quality improvement initiative, we were able to improve the utilization of ROAR in our resident physician clinic. In doing this, we hope to encourage our pediatric residents to continue to use books as a teaching tool for families in order to promote early literacy, develop therapeutic relationships with families, and learn developmental milestones.

REFERENCES

1. Kutner M, Greenberg E, Jin Y, Paulsen C. (2006). The health literacy of America's adults: Results from the 2003 National Assessment of Adult Literacy (NCES 2006–483). U.S. Department of Education. Washington, DC: National Center for Education Statistics. https://nces.ed.gov/pubs2006/2006483.pdf.
2. Understanding literacy and numeracy. (2019, November 13). Retrieved January 24, 2021, from https://www.cdc.gov/healthliteracy/learn/understandingliteracy.html
3. Council on Early Childhood. Literacy promotion: an essential component of primary care pediatric practice. *Pediatrics,* 2014;134(2), 404-409. doi:10.1542/peds.2014-1384
4. Home. (2021, January 06). Retrieved January 24, 2021, from https://www.reachoutandread.org/
5. Morrison A K, Glick A, Yin HS. Health literacy: implications for child health. *Pediatrics in Review,* 2019;40(6), 263-277. doi:10.1542/pir.2018-0027

STUDENT ARTICLE

The Clash of Culture and Medicine: is Chiari 1 a Curse?

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ABSTRACT

We often see the intersection of culture with medicine in the foods our patients consume, their activities of daily life, and their interpretation of disease states. However, unless we listen to their cultural, foundational beliefs, we can miss key factors that affect their health and outcomes. In this report, we discuss a case of a black teenage female born in Port-au-Price, Haiti, diagnosed with Chiari type 1 malformation with associated severe hydrocephalus and cervical, thoracic, and lumbar syringomyelia and cultural implications. She presented to her outpatient pediatrician for her well child exam with a secondary complaint of left arm weakness for the last four to five weeks. Given her grossly abnormal physical exam, she was admitted for a full evaluation diagnosing a Chiari type 1 malformation with the above complications. She underwent venticuloperitoneal shunt placement and revision within a week and refused pain control other than acetaminophen after surgery. Of note, the patient's mother passed away shortly after her birth from a suspected caesarian section operative wound infection. Interestingly, hydrocephalus is considered a curse in the Haitian culture and children born with hydrocephalus are often hidden from society. In her culture, the death of our patient's mother followed by developing hydrocephalus later in life could be considered evidence of the curse. It is well documented that pain is under recognized and under treated within our minority patients, but the cultural implications from being a product of a "curse" is a more worrisome outcome. Thus, it is imperative for us to be knowledgeable of our patient's views and beliefs to provide competent care.

Abbreviations: Magnetic Resonance Imaging (MRI), external ventricular drain (EVD)

Key Words: pediatric, hydrocephalus, Chiari 1, pain, culture, Haitian

INTRODUCTION

Chiari malformations consist of herniated rhomboencephalic structures (pons, medulla oblongata, and the cerebellum) through the foramen magnum and can be associated with obstructive hydrocephalus and syringomyelia. A Chiari type 1 malformation is when the cerebellar tonsils herniate through the fossa by at least 5mm and is the most frequently diagnosed type. Often diagnosed when asymptomatic by brain magnetic resonance imaging (MRI) for headaches or other reasons, Chiari type 1 is a relatively common occurrence.[1] However, when symptoms such as headaches that worsen with Valsalva, weakness, and/or parasthesias are present, surgical correction may be necessary.[2] Within occidental medicine (western or disease-focused), this diagnosis has little to no cultural implications. However, in Haitian culture, hydrocephalus can be viewed as a curse on a family. Sociocultural values and therapeutic beliefs are important to consider in the evaluation and management of the Haitian patient. According to the 2018 United States census, there are over a million Haitian Americans living in the United States, and to provide competent care, we must attempt to listen and understand their culture.

CLINICAL SUMMARY

We present a 15-year-old black Haitian female with no known significant medical history who presents to clinic for her well child exam. She had concerns of weakness and decreased sensation in the left upper and lower extremities and left trunk for 4 to 5 weeks. Symptoms began with occasionally dropping her phone and with a sensation of heaviness. Later she developed difficulty gripping objects and fully extending her fingers. She had never experienced symptoms like this before and did not have blurry vision, eye pain, difficulty swallowing, headache, nausea, vomiting or weakness elsewhere. Of note, she was born in Port-au-Prince, Haiti, and moved to the United States at the age of 11 years with her Aunt and Uncle. According to the Uncle, her mother died shortly after her birth from an infected caesarian section surgical site.

On exam, her head was consistently tilting towards the right side though her speech was normal. She had tenderness on palpation of the left forearm and digits. Additionally, her 3rd, 4th, and 5th digits were flexed at rest and extension caused pain. Strength in her left upper extremity was 3/5 distally and 5/5 proximally and her left lower extremity was near normal. In comparison, her right upper and lower extremities had 5/5 strength throughout. Sensation was intact yet subjectively decreased throughout the left arm and hand. Finger-nose testing was abnormal on the left arm with a tremor at extension and flexion back to nose. Most concerning, her tongue deviated to the right upon protrusion.

Upon further evaluation, her complete blood count, complete metabolic panel, serum magnesium, phosphorus, thyroid stimulating hormone, and serum creatine kinase were within normal limits. Erythrocyte sedimentation rate was slightly elevated at 31mm/hr [normal 0 – 20mm/hr]. MRI of the brain, cervical, thoracic, and lumbar spine with and without contrast demonstrated severe ventriculomegaly with 8mm of tonsillar descent below the foramen magnum as well as a prominent cord syrinx spanning syrinx the entire cervical cord, medulla oblongata, and thoracic cord until T11-T12. (Figure 1). A diagnosis of Chiari 1 malformation with ventriculomegaly and syrinx was made.

Neurosurgery was performed two days after presentation with suboccipital decompression craniotomy with autologous duraplasty, C1 laminectomy, and right occipital external ventricular drain (EVD) placement. She tolerated the surgery well with no acute events. However, after five days in the pediatric intensive care unit there was minimal improvement in her weakness, sensation, and imaging, Neurosurgery proceeded with ventriculostomy and permanent ventriculoperitoneal shunt placement after which her ventricular caliber decreased slightly and her neurological exam improved including normal tongue protrusion. Her pain was well controlled by the intensivist during her sedated, immediate post-operative period. However, she requested minimal pain medication with only occasional acetaminophen despite two major surgeries. Prior to discharge home, merely ten days after initial presentation, she regained near normal strength in her left arm and left hand grip. A week after discharge, she was seen in clinic with near normal extremity strength, normal gait and coordination, and only mild pain at her surgical site.

DISCUSSION

With the limitations of the Haitian medical system, preventive care is not fully integrated in Haitian customs., Haitians trust therapeutic resources that are less expensive and more familiar to them when they are sick. They use and trust traditional medicine (herbal tea and concoction), Houngans or Mambos (Vodou priest or priestess), Freemasons, or other spiritual healers. Diseases, and most importantly uncommon diseases, are seen as a curse sent by a jealous person or as a retribution for their

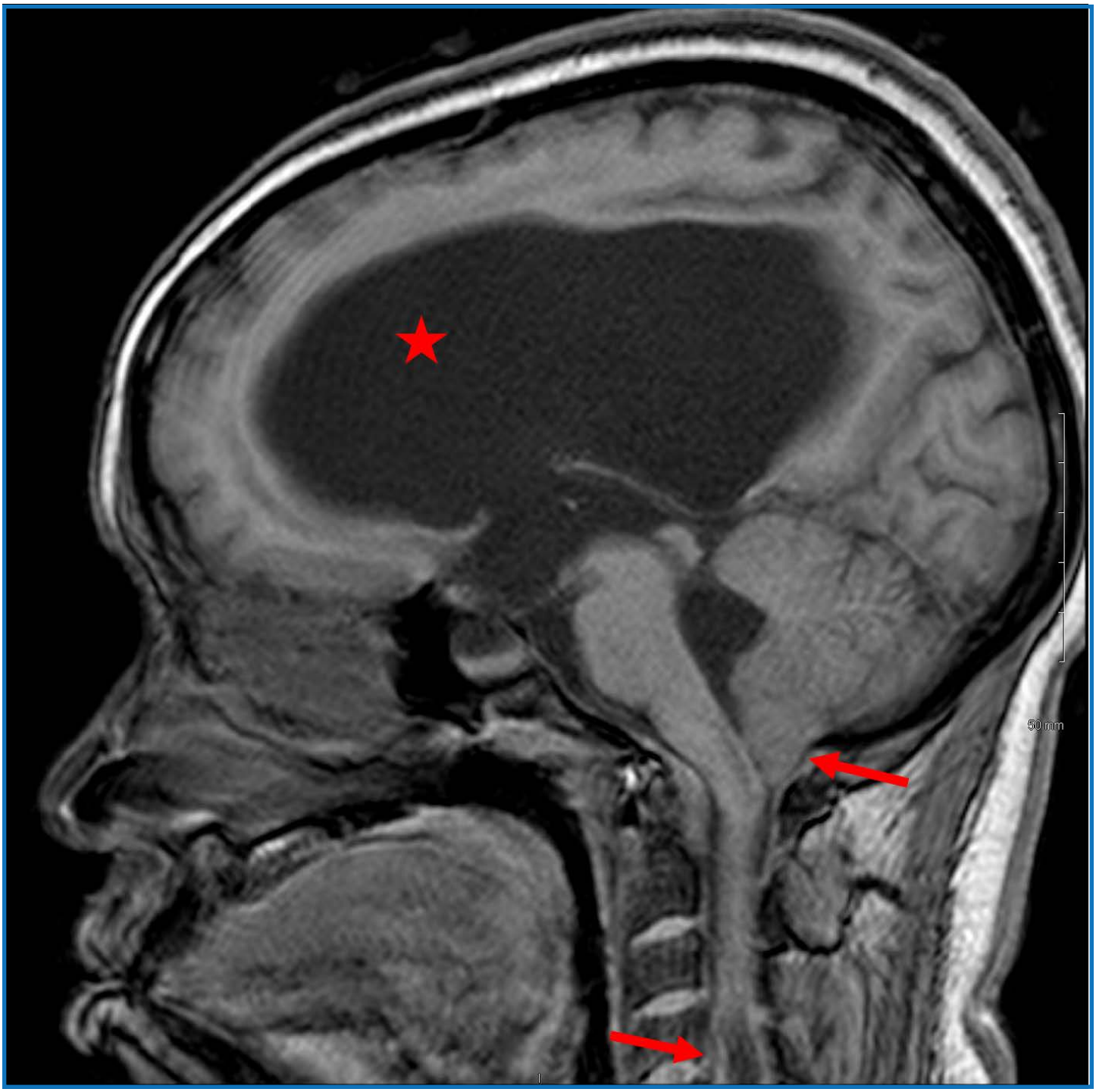

Figure 1: T1 sagittal MRI with and without contrast. Star indicating significant obstructive hydrocephalus of the lateral ventricles, extending into the third and fourth ventricles. Left facing arrow indicating cerebellar tonsil extension through the foramen magnum. Right facing arrow indicating associated cervical cord syrinx.

family or their own actions. The majority of Haitians acknowledge a belief in those practices making occidental medicine the last step in their therapeutic process.[3]

For our patient, the mother's death during childbirth is the first important clue in the history. This death might be considered a curse or retribution for what she had done in the past. Considering that the surviving child could carry the mother's curse, traditional medicine with involvement of the Vodou priest or Houngan is usually the first step in addressing any physical or psychological ailment. Vodou Gods (also known as Loas) that are seen as guardians and protectors will receive supplication, and the Houngan will intercede on behalf of the family to help take out the curse. This process can take months and even years if there is no deterioration in the clinical presentation. Given the dearth of primary care and specialized medicine in Haiti and considering the trust of Haitians in traditional medicine, seeking medical care may be postponed and only occur if the patient is extremely ill.

Haitians, of course, carry their beliefs and sociocultural background with them upon arrival to the United States,. Although they may seek medical care sooner in the States than they would in Haiti, they withhold certain details of the medical history for fear of being misunderstood or for not being able to fully trust occidental medicine. As such, "*Pluri-medicine*" (jointly using occidental medicine and traditional Haitian medicine) is the norm rather the exception. All this background could explain our patient's late presentation to care.

Another non-negligible cultural aspect for this patient is pain management. Growing up, a child is deemed "dur" (or resilient) on how the child handles different situations. Not verbalizing suffering, being strong, and avoiding complaining is culturally desired. Incessant complaining is considered shameful, but whether this learned behavior provides for a higher pain threshold remains to be proven. In general, it seems that the suffering exists but the shame one feels about complaining, the cultural tolerance of pain, and the resilience one must demonstrate are learned early in life. Asking for pain medication for everything is not a Haitian custom. It is most likely that our patient learned to cope with pain without complaining, or she may feel ashamed of not being able to sustain the pain that followed her surgery. This cultural attribute of avoidance to complaining could also attribute late presentation for care of her symptoms.

Overall, treating a Haitian patient while remaining sensitive to their background and being knowledgeable of their culture and beliefs creates a better alliance between the patient, family, and clinician and will ultimately improve the patient's outcome. As a healthcare community, we must continue to educate ourselves on these cultural nuances to provide better care. By increasing awareness and cultural sensitivity, we can further earn our patient's trust which ultimately enhances their care.

REFERENCES

1. Spazzapan P, Bosnjak R, Prestor B, Velnar T. Chiari malformations in children: An overview. World J Clin Cases. 2021 Feb 6;9(4):764-773. doi: 10.12998/wjcc.v9.i4.764. PMID: 33585622; PMCID: PMC7852648.
2. McClugage, S. G., III, & Oakes, W. J. (2019). The Chiari I malformation, *Journal of Neurosurgery: Pediatrics PED*, *24*(3), 217-226. Retrieved May 10, 2021, from https://thejns.org/pediatrics/view/journals/j-neurosurg-pediatr/24/3/article-p217.xml
3. Desrosiers A, St Fleurose S. Treating Haitian patients: key cultural aspects. Am J Psychother. 2002;56(4):508-21. doi: 10.1176/appi.psychotherapy.2002.56.4.508. PMID: 12520887.

DEPARTMENT REPORT

The Expert Generalist: An Approach to Enhance Access to Pediatric Subspecialty care

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Unlike Internal Medicine, where there is a significant shortage of primary care doctors compared to subspecialists, pediatrics has the opposite problem. Internal medicine has 36 subspecialists for every 100,000 adults, whereas there are approximately 13 pediatric subspecialists for every 100,000 children, contributing to significant pediatric subspecialist shortage.[9] This report details how we have addressed this issue through a program that trains and mentors primary care pediatricians in subspecialty care to serve as expert generalists and augment subspecialty care delivery.

A recent survey of primary care pediatricians revealed significant dissatisfaction with the availability of subspecialists. These shortages are also more likely to be reported in the rural areas compared to urban areas.[1] The American Academy of Pediatrics issued a policy statement in 2015 concluding that there is a shortage of pediatric medical and surgical subspecialists in the US.[2] This issue is especially concerning, as the increasing number of children with complex medical problems need subspecialist support which may typically be beyond the scope of practice for the primary care pediatrician.[3]

A Children's Hospital Association survey in 2017 found shortages of providers in several pediatric subspecialties. These fields include developmental pediatrics, child psychiatry, genetics, and pain management, among others.[4] There are also several states in the United States that do not have access to many critical pediatric subspecialties. For example, there are no pediatric endocrinologists in Alaska, Idaho, Montana, or Wyoming, nor are there any gastroenterologists in Montana, Vermont, or Wyoming. In addition, many families often have to travel long distances for pediatric subspecialty care. Nationally, children travel on average 60 miles to reach pediatric rheumatologists, 44 miles to reach developmental pediatricians, and 32 miles to reach pediatric gastroenterologists.[5]

Data from American Board of Pediatrics also show that fewer trainees are entering certain disciplines including development/behavior pediatrics, child psychiatry, pulmonology, endocrinology, gastroenterology and child protection, which will further contribute to subspecialty provider shortage.

The Department of Pediatrics at University of Florida (UF) provides subspecialist services in each of the major pediatric subspecialties. Nonetheless, in some subspecialties, our workforce was inadequate to meet local and regional needs. To address this need, in 2016, we developed an Expert Generalist Program to compliment the pediatric subspecialists. Through analyses of electronic records data, we monitored wait times to next third new patient appointment based on the consultation requests by the primary care pediatricians, and identified specialties that would benefit with the additional workforce. These areas and related diagnoses included Neurology for evaluation and management of headaches; Developmental/Behavioral Pediatrics, and Psychiatry for Attention Deficit Hyperactivity Disorder, learning difficulties, autism, anxiety and depression; Gastroenterology for abdominal pain and constipation; and Endocrinology for hyperlipidemia, insulin resistance and obesity.

Training of the expert generalists included working in tandem with respective subspecialists and didactic training. The expert generalists were embedded in the subspecialty clinics where they worked in close conjunction, literally co-located, with the specialists. The expert generalists were mentored by the specialists, attended multiple Continuing Medical Education lectures on the conditions they were managing, and attended the weekly divisional educational meetings. The pediatric specialists and the expert generalists developed protocols for the patient answering service to direct patients with certain conditions to the expert generalists in place of the subspecialists. This system served to triage patients, as the expert generalists were assigned patients according to a specific list of chief complains.

The UF Expert Generalist program, in its five years since its inception, has been successful. After implementation of the Expert Generalist program, the third available new patient appointment for a developmental pediatrician reduced from over four to six months to within a week. Similar significant improvements were seen in headache clinic, metabolic/obesity clinic and gastroenterology clinic. The ability to get patients with above conditions into clinic all reduced, since the expert generalist were able to triage patients who would truly benefit from a subspecialty visit.

The referring pediatricians and patients demonstrated high levels of satisfaction with the ability to be seen in a timely manner. This higher level of satisfaction, in addition to the enhanced access, was reflected in the significant increase in the referrals to all clinics. The highest increase was in development/behavior pediatrics, which more than doubled from 2016 to 2021. Amongst the different pediatric subspecialties served by the program, the largest proportion of patients seen by the expert generalists was in child development behavior clinic.

The subspecialists and expert generalist were also satisfied with the program, which continues to grow. The subspecialists were now able to utilize their time to care for patients with high levels of complexity as well as initiate new programs as part of their academic mission. The expert generalists had high job satisfaction, as they were able to care for patients and conditions that they had an interest in, while still being able to practice general pediatrics.

Patients referred from outside the primary care practice were billed as consultations while patients referred from within the practice were either billed as consults or return patients based on the request from the referring providers.

In summary, the Pediatric subspecialty shortage is a pressing concern and innovative solutions such as the expert generalist program can improve access without sacrificing quality. As we have shown this program benefits the patients, referring physicians, the subspecialists, as well as the expert generalists themselves.

REFERENCES

1. Pletcher BA, Rimsza ME, Cull WL, et al. Primary care pediatricians' satisfaction with subspecialty care, perceived supply, and barriers to care. *J Pediatr.* 2010;156(6):1011-1015 e1011.
2. Basco WT, Rimsza ME. Committee on Pediatric Workforce, American Academy of Pediatrics. Pediatrician workforce policy statement. *Pediatrics.* 2013;132(2):390-397.
3. Cohen E, Patel H. Responding to the rising number of children living with complex chronic conditions. *CMAJ.* 2014;186(16):1199-1200.
4. Harris M. Pediatric workforce shortages persist. 2018. Accessed 03/03/2019.
5. Mayer ML. Are we there yet? Distance to care and relative supply among pediatric medical subspecialties. *Pediatrics.* 2006;118(6):2313-2321
6. Fins JJ. The expert-generalist: a contradiction whose time has come. *Acad Med.* 2015;90(8):1010-1014.

7. Di Guglielmo MD, Plesnick J, Greenspan JS, Sharif I. A new model to decrease time-to-appointment wait for gastroenterology evaluation. *Pediatrics.* 2013;131(5):e1632-1638.
8. Gary L. Freed, Lauren M. Moran, Kenton D. Van, Laurel K. Leslie, on behalf of the Research Advisory Committee of the American Board of Pediatrics, Current Workforce of Pediatric Subspecialists in the United States
9. Chapter 2 Legislative Update ny2aap.org/chapter-2-legislative-update
10. Comparison of number and geographic distribution of pediatric subspecialists and patient proximity to specialized care in the US between 2003 and 2019. *JAMA Pediatr* 2020;9:852-86. doi:10.1001/jamapediatrics.2020.1124
11. Children's Hospital Association. Pediatric workforce shortages persist. https://www.childrenshospitals.org/Issues-and-Advocacy/Graduate-Medical-Education/Fact-Sheets/2018/Pediatric-Workforce-Shortages-Persist
12. Rochlin JM, Simon HK. Does fellowship pay: what is the long-term financial impact of subspecialty training in pediatrics? *Pediatrics*. 2011;127(2):254–26.
13. https://www.entnet.org/sites/default/files/4-3-14-Pediatric-Loan-Repayment.pdf
14. Ray KN, Bogen DL, Bertolet M, Forrest CB, Mehrotra A. Supply and utilization of pediatric subspecialists in the United States. *Pediatrics* 2014;133(6):1061-1069.
15. Ratio of pediatric subspecialists to children by hospital referral region, 2019 https://www.abp.org/content/ratio-pediatric-subspecialists-children-hospital-referral-region
16. Estimated driving distance to visit a pediatric subspecialist, 2019. https://www.abp.org/content/estimated-driving-distance-visit-pediatric-subspecialist


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