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Pediatric Hypertension Specialists' Perspectives About Adolescent Hypertension Management: Implications for Primary Care Providers

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Abstract

Background—The current specialty-centric hypertension paradigm is unsustainable given the high prevalence of primary hypertension in adolescents.

Objective—To describe specialists' perspectives on referral and comanagement for adolescents with hypertension.

Methods—Cross-sectional mailed survey of a national sample of 397 pediatric cardiologists and 389 pediatric nephrologists, conducted January to May 2014.

Results—Response rate was 61%. Both specialties agreed that primary care providers can make the hypertension diagnosis, try lifestyle changes, and comanage monitoring of patient blood pressure control and medication side effects, but they felt antihypertensive medication use should mainly occur in the specialty setting.

Conclusions—Our study suggests specialist support for changing the hypertension paradigm to encourage primary care providers, in collaboration with specialists, to diagnose hypertension, initiate lifestyle changes, and monitor progress and side effects. Future work should focus on supporting primary care physician comanagement of adolescents with hypertension.

Keywords

hypertension; adolescents; primary care; nephrology; cardiology; referral practices; comanagement

Introduction

There is growing concern about the increasing prevalence of primary hypertension in children and adolescents because of its association with childhood obesity.[1-5] Prior research of children with hypertension has shown that nearly two thirds of children 6 to 11 years and more than 80% of adolescents have primary hypertension.[6-9]

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Declaration of Conflicting Interests

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Typically, children and adolescents with hypertension (primary and secondary) are primarily managed by pediatric hypertension specialists (e.g., pediatric cardiologists and pediatric nephrologists), whereas primary hypertension in adults is primarily managed by primary care providers (PCPs).[7,8] This is consistent with prior research suggesting primary care pediatricians are uncomfortable in treating and managing pediatric hypertension.[10,11] However, the “refer all” approach is unlikely to be sustainable by pediatric cardiology or pediatric nephrology workforce, and it is a source of frustration for some pediatric hypertension specialists.[11] Little is known about pediatric hypertension specialists’ perspectives about which aspects of adolescent hypertension treatment and management can reasonably occur in the primary care setting prior to specialist referral. The purpose of this study was to describe the specialists’ perspectives on current referral and comanagement practices for adolescents with hypertension.

Methods

We conducted a cross-sectional, mailed survey of a national sample of pediatric cardiologists and pediatric nephrologists providing outpatient care, fielded from January to May 2014. This study was approved by the institutional review board of the University of Michigan Medical School.

Study Sample

Through a contracted vendor, we obtained a national random sample of pediatric cardiologists and pediatric nephrologists from the American Medical Association (AMA) Physician Masterfile, a comprehensive database of licensed physicians in the United States that includes both AMA members and nonmembers. Our sampling frame included allopathic and osteopathic physicians self-described with a primary specialty of pediatric cardiology or pediatric nephrology in office-based practices providing direct patient care. We excluded physicians >70 years of age, in residency training, in practice on military bases, or with a secondary specialty of interventional cardiology. Our target sample was 400 pediatric cardiologists and 400 pediatric nephrologists, from which we excluded 14 physicians (3 pediatric cardiologists and 11 pediatric nephrologists) who were retired from practice or practicing in Puerto Rico.

Survey Design

The survey instrument was developed based on our prior qualitative study of physician experiences and preferences for the management of hypertension in adolescents. [11] The survey instrument included 13 fixed-choice items pertaining to problems in PCP referral of adolescents (12-17 years old) with suspected hypertension, what PCPs should do *before* referral, preferences on comanagement of hypertension management, and practice characteristics.

Survey Administration

The initial survey mailing was sent to 786 physicians (397 pediatric cardiologists and 389 pediatric nephrologists) that included a personalized cover letter, the survey instrument, a

prepaid return envelope, and a small incentive. Two additional mailings to nonrespondents occurred at 5-week intervals.

Data Analysis

Descriptive analyses included simple counts and frequencies. We used crosstabs and χ^2 tests (including Fisher's exact test) to assess associations between specialist characteristics and their perspectives about adolescent hypertension management. *P* values .05 were considered statistically significant.

Results

Response Rate

Of the 786 physicians in the mailing sample, 67 were excluded because mailings were undeliverable (28 pediatric cardiologists, 39 pediatric nephrologists). Surveys were returned by 445 (245 pediatric cardiologists, 200 pediatric nephrologists) of the remaining 719 physicians, for an overall response rate of 61% (66% pediatric cardiologists, 56% pediatric nephrologists). Forty-six physicians (25 pediatric cardiologists, 21 pediatric nephrologists) indicated that they did not see patients 12 to 17 years old and were excluded from data analyses resulting in final analytic sample of 399 physicians (220 pediatric cardiologists, 179 pediatric nephrologists).

Respondent Demographics and Practice Characteristics

Fifty-five percent of respondents were pediatric cardiologists and 45% were pediatric nephrologists. Demographic and practice characteristics by physician specialty are shown in Table 1. Overall, the majority of respondents were male; more pediatric cardiologists than nephrologists were male (72% vs 51%; $P < .0001$). Mean physician age was 47 years for both specialties. More pediatric nephrologists practiced in a hospital medical center/university health system (pediatric nephrologists 88% vs pediatric cardiologists 72%; $P < .0001$), and more pediatric cardiologists in private practice. Pediatric nephrologists saw more patients for hypertension in a typical week and considered themselves to be hypertension experts more so than pediatric cardiologists. More pediatric cardiologists than nephrologists reported that their colleagues were hypertension experts (26% vs 17%; $P < .0001$).

Desired Referral Practices of Primary Care Providers

Specialists' perspectives on desired referral practices of PCPs are described in Table 2. Nearly all respondents in both specialties reported PCP should verify elevated blood pressure (BP) using multiple methods before referring adolescents with suspected hypertension. There was less consensus about ruling out white coat hypertension and instituting lifestyle changes. Very few physicians in either specialty reported that PCPs should start antihypertensive medications before referral.

Both specialties use BP 95th percentile on 3 separate visits as the threshold for referral; more pediatric cardiologists than nephrologists use consistently elevated BP for 6 months as threshold for referral. The majority of both specialties desired PCPs to obtain urinalysis, electrolytes, and complete blood count before referral. Less desired were renal ultrasounds,

echocardiograms, or electrocardiograms. Nearly one quarter of pediatric cardiologists and one third of pediatric nephrologists preferred to do all testing themselves (Table 2).

Perceived Problems in PCP Referral of Adolescents With Hypertension

Specialists' perspectives on PCP referral of adolescents with hypertension are described in Table 3. The most commonly cited major problem among pediatric cardiologists was overreferral due to inaccurate BP readings, while pediatric nephrologists were equally likely to cite failure to appreciate the need to treat adolescent hypertension and waiting too long to refer as major problems.

Preferences on Comanagement of Adolescents With Hypertension

Specialists' preferences on comanagement of adolescents with hypertension are described in Table 4. Across the spectrum of hypertension diagnosis and management, more pediatric cardiologists than nephrologists felt that PCPs should do more, either independently or under the direction of the specialist. Making the hypertension diagnosis was endorsed most frequently by both specialist groups as something PCPs should do independently, followed by monitoring blood pressure control and medication side effects. The majority of both specialties felt that specialists, not PCPs, should initiate antihypertensive medications and change medication dose/type.

Provider Comfort With Hypertension Diagnosis and Management

Specialists' perspectives on the comfort level of PCPs and themselves in the diagnosis and management of adolescents with hypertension are described in Table 5. The majority of both specialties reported that general pediatricians were somewhat or very uncomfortable (79% pediatric cardiologists vs 75% pediatric nephrologists) in adolescent hypertension diagnosis and management. Conversely, more pediatric cardiologists and nephrologists reported that family physicians were somewhat or very comfortable (56% vs 50%) in hypertension diagnosis and management. More pediatric nephrologists than cardiologists reported that they were very comfortable in adolescent hypertension diagnosis and management (94% vs 59%).

Discussion

Our study describes, for the first time, pediatric hypertension specialists' perspectives on various aspects of diagnosis and management of adolescents with hypertension—particularly in the domain of referral and comanagement practices of relevance for PCPs. Three overarching themes became apparent in our study. First, although both specialties reported that the use of antihypertensive medications (initiation and change in dose/type) should occur primarily in the specialty setting, there was divergence from the current pediatric hypertension paradigm where both specialties consistently reported that making the hypertension diagnosis and monitoring patients for medication side effects and BP control should occur in the primary care setting or be done by PCPs under specialist direction. It makes sense that monitoring patients for side effects and BP control should occur in the primary care setting that is more accessible to patients given that close monitoring requires multiple return visits. Moreover, many pediatric cardiologists and nephrologists also

indicated that PCPs should try lifestyle changes for their patients before referral. This reinforces the evolving perspectives of hypertension specialists where several aspects of adolescent hypertension management can be initiated in the primary care setting prior to specialty referral. This has implications for PCPs to work with specialists in assuming a larger role in the comanagement of several aspects of adolescent hypertension management in the primary care setting instead of continuing the hands-off, refer-all approach.

Second, pediatric cardiologists are less likely to consider themselves as hypertension experts, see fewer patients with hypertension, and have lower self-confidence in their adolescent hypertension management than pediatric nephrologists. Because they recognize these limitations in their own practice, pediatric cardiologists appear to be more enthusiastic about an expanded role in hypertension comanagement for PCPs.

Third, overreferral of adolescents for suspected hypertension due to inaccurate BP readings by PCPs was viewed as an ongoing challenge, with improvement needed to achieve specialists' most-cited desired referral practices of verifying elevated BP using multiple methods. Measurement accuracy of BP readings has been a well-documented problem in primary care, often related to the use of incorrect arm cuff size or the common use of automated oscillometric devices that are convenient but are not as accurate as manual auscultation.[12,13] Furthermore, manual auscultation is dependent on the variable skillset of the individual obtaining BP readings—often medical assistants in PCPs' offices. It is likely that staff training, along with ensuring appropriate equipment, will be needed to improve BP measurement accuracy in the primary care setting.

Limitations

Our findings should be interpreted with the following limitations. The data are subject to potential physician self-reporting biases and actual clinical practice may vary from the survey responses. Also, our survey focused on referral and comanagement issues of relevance to primary care providers from the perspectives of pediatric cardiologists and nephrologists and did not address other complex issues involved in pediatric hypertension management such as specifics of pharmacologic therapy, treatment adherence and patient outcomes.

Conclusion

Findings from our study suggest a change in the pediatric hypertension paradigm where several aspects of hypertension management including making the diagnosis, initiating lifestyle changes, and monitoring for side effects and BP control can reasonably occur in the primary care setting in collaboration with hypertension specialists. Future efforts should develop tools to support PCP and hypertension specialists in their comanagement of adolescents with hypertension.

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Table 1

Demographic and Practice Characteristics, by Specialty.

	Overall, N = 399	PC, n = 220	PN, n = 179
Sex ^a			
Male	63%	72%	51%
Female	37%	28%	49%
Age (years)			
Mean	47	47	47
Minimum	32	33	32
Maximum	69	69	69
Time since medical school graduation (years)			
Distribution			
<10 years	18%	16%	19%
10-19 years	30%	30%	31%
20-29 years	31%	33%	29%
30+ years	21%	20%	21%
Practice setting ^a			
Hospital medical center/university health system	79%	72%	88%
Private independent practice	17%	25%	7%
Health maintenance organization/other	4%	3%	5%
Number of patients seen for hypertension in an average week			
<1	13%	22%	1%
1-2	32%	47%	14%
3-5	28%	24%	32%
6-15	22%	5%	43%
16+	6%	2%	10%
Hypertension specialist in clinic ^a			
Myself	12%	7%	18%
Colleagues	22%	26%	17%
We all specialize equally	59%	55%	63%

Abbreviations: PC, Pediatric Cardiology; PN, Pediatric Nephrology.

^a statistically significant difference between specialists at a level of $\alpha = .05$.

Table 2Desired Referral Practices of Primary Care Providers.^a

	PC, %	PN, %	P Value
What specialists would like PCP to do before referral			
Verify elevated BP using multiple methods	91	99	.0008
Rule out white coat HTN	69	26	<.0001
Lifestyle changes 3-6 months	56	40	.0018
Start antihypertensive medications	3	3	.82
Desired threshold for elevated BP that PCPs should use to refer for specialist care			
BP 95 th percentile on 3 separate visits	86	92	.0607
Consistently elevated BP for 6+ months	19	11	.0233
Tests to be done by PCP before referral			
Urinalysis, electrolytes, complete blood count	75	65	.0273
Renal ultrasound	40	25	.0024
Echocardiogram	2	17	<.0001
Electrocardiogram	7	7	.9969
None – I prefer to do tests in my own clinic	21	32	.0177

Abbreviations: PCP, primary care physician; PC, Pediatric Cardiology; PN, Pediatric Nephrology; BP, blood pressure; HTN, hypertension.

^aPC, n = 220; PN, n = 179.

Table 3Perceived Problems in PCP Referral of Adolescents for Suspected HTN.^a

	<u>Major Problem</u>		<u>Minor Problem</u>		<u>Not a Problem</u>		<i>P</i> Value (Comparing Distributions)
	PC, %	PN, %	PC, %	PN, %	PC, %	PN, %	
PCPs overrefer due to inaccurate BP readings	39	28	48	50	13	22	.0215
PCPs do not identify white coat HTN	22	13	61	56	17	31	.0009
PCPs wait too long to refer	9	27	25	38	66	35	<.0001
PCPs fail to appreciate the need to treat HTN in adolescents	16	30	41	38	43	31	.0019

Abbreviations: PCP, primary care physician; PC, Pediatric Cardiology; PN, Pediatric Nephrology; BP, blood pressure; HTN, hypertension.

^aPC, n = 220; PN, n = 179.

Table 4Specialist Preferences on Comanagement of Adolescents with HTN.^a

	PCP Should do Independently		PCP Should do Under Specialist Direction		Specialist Should do Independently		P Value (Comparing Distributions)
	PC, %	PN, %	PC, %	PN, %	PC, %	PN, %	
Make the hypertension diagnosis	61	51	21	20	17	25	.0569
Work up the patient for secondary causes	32	5	36	26	30	65	<.0001
Initiate antihypertensive medications	6	2	23	19	71	75	.0251
Change medication dose/type	7	1	33	20	59	74	<.0001
Monitor medication side effects	26	8	48	41	24	41	<.0001
Monitor BP control	36	16	48	42	14	28	<.0001

Abbreviations: PCP, primary care physician; PC, Pediatric Cardiology; PN, Pediatric Nephrology; BP, blood pressure; HTN, hypertension.

^aPC, n = 220; PN, n = 179.

Table 5Provider Comfort with Adolescent HTN Diagnosis and Management.^a

	<u>Very Comfortable</u>		<u>Somewhat Comfortable</u>		<u>Somewhat Uncomfortable</u>		<u>Very Uncomfortable</u>	
	PC, %	PN, %	PC, %	PN, %	PC, %	PN, %	PC, %	PN, %
Referring general pediatricians; <i>P</i> value: .7825	1	2	19	22	55	54	24	21
Referring family practitioners; <i>P</i> value: .4827	7	7	49	43	33	35	10	15
Myself; <i>P</i> value: <.0001	59	94	31	3	7	0	3	3

Abbreviations: PC, Pediatric Cardiology; PN, Pediatric Nephrology; HTN, hypertension.

^aPC, n = 220; PN, n = 179.