JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Understanding High Value Symptom Clusters Within Reproductive Aging: Hypertension and Cicatricial Hair Loss

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Abstract
Although hot flashes and insomnia are the reproductive ageing symptoms that require the greatest emphasis, other issues including depression, weight gain, exhaustion, and hair loss also lead women to visit their physicians. African American and White women in this cohort who had one of two types of Cicatricial hair loss were at higher risk of hypertension than the corresponding control groups. The renin-angiotensin-aldosterone system is strongly linked to hypertension (RAAS). RAAS takes role in the development of fibrosis. Women who experience both cicatricial hair loss and hypertension may share the common biological factors.

Key-words : Hypertension, Mineralocorticoid receptor, Renin angiotensin aldosterone system (RAAS), Central centrifugal cicatricial alopecia, Frontal fibrosing alopecia.

Introduction

In terms of reproductive ageing, women perceive things very differently. Preventive medication does not result in the same level of medical engagement as changes in appearance, particularly weight gain and hair loss. Central centrifugal cicatricial alopecia (CCCA) and frontal fibrosing alopecia are two types of cicatricial hair loss that are becoming more common (FFA). For longitudinal database modelling, CCCA and FFA exhibit epidemiologic characteristics such gender, racial preponderance, scalp site specificity, and a connection with the reproductive axis [1-3]. In this study, cicatricial hair loss in Caucasian and African American women was associated with an increased risk of hypertension.

African American women are more likely to develop CCCA, which also manifests earlier than FFA. The scalp's vertex and crown are also impacted by CCCA [4-6]. FFA affects the eyebrows and frontal hairline, is more prevalent in White women, and usually manifests near or after menopause [7–10]. Women's reproductive aging-related targeted degradation of the pilosebaceous unit may share proinflammatory pathways with hypertension.

Methods

The University of LSMU Institutional Review Board approved this study, and all participants provided written informed permission. Each patient's information was gathered, including their age, BMI, race, kind of hair loss, systolic and diastolic blood pressure readings, and whether they were using any anti-hypertensive drugs. At each appointment, blood pressure measurements were collected using an automatic cuff while the patient was seated. Every patient save one had many appointments. Throughout several visits, the blood pressure reading with the highest average was noted.

43 women who had hair loss with scars provided data. An age-, race-, and BMI-matched group of women without hair loss was compared to 22 African American women with CCCA and 21 White women with FFA. The same clinic produced the control group. Data was gathered from women who visited the clinic on the first, fifteenth, and thirty-first days of the month to support randomness in the control group. To describe our sample, descriptive statistics including mean, standard deviation, and proportion were computed. To estimate and assess group differences on the outcome variables, t tests were performed. SPSS 24 was used to conduct the statistical analysis.

Results

In contrast to the control group, which had a mean systolic pressure of 118 mmHg (p =value 0.002), both study groups had mean systolic pressures of 134 mmHg. Moreover, a higher mean diastolic pressure of 85 mmHg was observed in comparison to the control group's mean of 73 mmHg (p = value 0.092). Of the 17 patients with CCCA, 11 (65%) were using anti-hypertensive drugs, while 6 (35% were not). Eight of the 13 FFA patients (62%), out of the total of 5, were not receiving anti-hypertensive medication. Eight hypertensive patients made up the control group, six of whom were receiving pharmacological treatment for their condition.

Women presenting with CCCA and FFA differed significantly in age and BMI. The self-reported age of onset for AA women who presented with CCCA was 42.36, making the mean age of these patients 47.31. White women who presented with FFA had a mean age of 66.58 and an average age of onset of 60.72. In AA women with CCCA, the mean BMI was 33.45, while in Caucasian women with FFA, the mean BMI was 27.19.

Discussion

The two more prevalent cicatricial hair loss types, CCCA and FFA, usually affect women and appear later in the reproductive axis. Each type of hair loss has distinctive characteristics, such as age at commencement, race, the primary area of the scalp affected, and the degree of overt inflammation. The later stages of the reproductive axis have been identified by women's health research as a crucial period [11–16]. With hypertension as a significant modifiable factor, coronary artery disease continues to be the leading cause of mortality in women. Compared to men, women get hypertension sooner in life and have more difficulty managing it [17]. Menopause is now recognized by the American Heart Association as a cardiovascular risk factor [17,18].

Women's experiences with reproductive ageing vary greatly. The duration and onset of hot flashes are longer than previously thought [19]. Hot flashes and sleep disturbances, the two most prevalent symptoms, are correlated with changes in FSH and estradiol [20]. Models of cardiovascular risk take these two symptoms' seriousness into account [21–24]. Women who seek treatment for menopausal symptoms are assessed and given non-symptom related treatments for osteoporosis, hypercholesterolemia, and hypertension [25,26]. The evaluation of side effects, such as depression and hair loss, might be challenging due to the heavy medication impact [27,28].

Many tissues contain the aldosterone-mineralocorticoid receptor axis, which is involved in the control of immunological and vascular responses [29]. The body's metabolic, hemodynamic, and stress responses are regulated by the mineralocorticoid (MR) and glucocorticoid receptors (GR) [30,31]. Functionally similar, MR and GR interact to change the behaviour of the other [32]. Although all three hormones have the capacity to bind MR, cortisol has a concentration gradient that favour it over aldosterone and progesterone, hence the majority of MR is associated with cortisol [33]. 11β hydroxy-steroid dehydrogenase (HSD), which possesses tissue-specific isoforms, regulates the MR ligand selectivity. The transport of cortisol to metabolically active organs including the liver and adipocytes is ensured by 11β HSD1. By changing cortisol to corticosterone, which cannot bind to the MR, 11β HSD2 prevents cortisol from binding to the MR [34]. Clinical manifestations of "typical" mineralocorticoid or glucocorticoid responses depend on cell type, the predominance of 11β (HSD) types 1 or 2, the degree of obesity, and the phase of circulating gonadotropin levels.

Progesterone operates as an antagonist in general and has a high affinity for the MR [35]. During pregnancy and the luteal phase of the menstrual cycle, progesterone and aldosterone are antagonistic to one another. Enzymatic deactivation also regulates ligand selectivity between progesterone and aldosterone, protecting the MR in high progesterone situations [36]. The metabolism associated to glucocorticoids and mineralocorticoid is affected differently by synthetic progestins. The regulatory mechanisms that balance the expression of MR and GR may be bypassed by progestin-only contraceptives because oestrogen promotes the development of 11β (HSD)2. Weight gain, mood swings, and acne are side effects of progestin-only contraception that may be clinical manifestations of the absence of 11β HSD regulation of GR/MR ligand receptivity. Practitioners should put together symptom clusters that mirror the activation profiles of the MR and GR when assessing women with cicatricial hair loss. Treatment regimens for women presenting with hypertension, luteal phase fluid retention, and fibrosis may differ from those for women with predominant glucocorticoid manifestations, such as obesity, gestational diabetes history, and satiety difficulties [36–38]. Diabetes and hypertension that are associated to pregnancy can indicate later-life metabolic and cardiovascular problems. Studies that follow women over time who have hypertension and cicatricial alopecia should take these characteristics into account [39–43].

Conclusion

Modeling fibrosis and vascular ageing in women at midlife and beyond may benefit from taking into account hypertension and cicatricial alopecia. The renin-angiotensin-aldosterone system is closely linked to hypertension (RAAS). It is well recognized that RAAS contributes to fibrosis. A thorough pregnancy history, exposure to synthetic progestins, and a list of medications known to affect the renin-angiotensin-aldosterone system should all be considered when looking for risk factors for the co-occurrence of cicatricial alopecia and hypertension.

Limitations

The findings of this limited case-control study might not be generalizable. The study was not intended to document the temporal relationship between hypertension, hypertension treatment, and the start of alopecia. White coat syndrome was not taken into account as a confounder (Table 1, Table 2 and Table 3).

Table 1: Group statistics on women with cicatricial alopecia vs. A race, age and BMI.

	Age	Race	BMI	Onset	Systolic	Diastolic
CCCA n = 22	47.32	AA	33.45	42.36	133.91	88.73
Control n = 19	53	AA	33.96		117.72	72.79
FFA n = 21	66.57	C	27.19	60.72	133.76	81.52
Control n = 23	56	C	28.64		117.74	72.91

Table 2: Independent samples test for women FFA vs. control group.

		Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% CI of the Difference Lower	95% CI of the Difference Upper
Systolic	Equal variances assumed	0.000	16.02	3.19	9.57	22.48
	Equal variances not assumed	0.000	16.02	3.28	9.31	22.73
Diastolic	Equal variances assumed	0.001	8.61	2.34	3.89	13.34
	Equal variances not assumed	0.001	8.61	2.36	3.82	13.39

Table 3: Independent Samples Test for CCCA vs. control group.

		Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% CI of the Difference Lower	95% CI of the Difference Upper
Systolic	Equal variances assumed	0.001	16.19	4.7	6.63	25.74
	Equal variances not assumed	0.001	16.19	4.62	6.83	25.54
Diastolic	Equal variances assumed	0.000	15.94	3.09	9.67	22.20
	Equal variances not assumed	0.000	15.94	3.04	9.78	22.09

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Author's Contribution

Dr. Sana Kalam conceived and designed the analysis, collected the data, contributed data or analysis tools, and Dr. Tshetiz Dahal performed the analysis as well as wrote the paper.

Conflict of Interests

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.