Seasonal hair loss

Fatema A. K. Hamad

College of Medicine University of Babylon, Hilla, Babylon, Iraq.

Abstract

Back ground: There are about 100,000 hair follicles in the scalp, which have the capacity of growing and re-growing hair several times in their life span. Hair loss is a natural phenomenon. Hair has to fall out, so that there is place for new healthy hair to grow. Being mammals, we generally shed hair, during the onset of winter. Seasonal hair loss has been observed in eight healthy women during spring.

Aim of the study:To assess the seasonality of hair loss.

Design: Prospective study of eight healthy women who complains of recurrent hair loss during spring time.

Patients and method: Eight patients with recurrent hair loss during spring season were observed for 12 months for possible seasonal pattern of scalp hair loss. A careful examination of the patients was carried out including hair pull test, performed twice monthly for 12 months. The test was done over different sites of the scalp including the top and the sides. The hair is prepared by instructing the patients not to wash their hair 24 hours before test.

Results:Telogen percentages by month of year showed an overall annual periodicity, manifested by a maximal proportion of telogen hair in April.

Conclusion: These results confirm the findings of former authors who have indicated seasonal changes in human hair growth, although the previous studies had shown a larger peak in July and a smaller peak in April, this study had shown a larger peak during April. This may be due to difference in season's lengths between Iraq and other countries.

الخلاصة

هناك ما يتراوح على مئة الف بصيلة شعر من فروة الراس ، وكلها قادرة على انماء واعادة انماء الشعر العديد من المرات خلال فترة حياتها .ان تساقط الشعر ظافرة طبيعية لابد للشعر من التساقط لكي ينمو بدلا منه شعر صحي جديد ولكوننا من الثدييات فاننا بطبيعة الحال نفقد شعرا في بداية الشتاء . تم تساقط الشعر الموسمس لدى ثمالنية من النساء التي تتمتع بصحة جيدة وذلك اثنـــا الربيع .

الغرض من الدراسة : لتبيان وجود الموسميه في تساقط الشعر

تصميسم الدراسة :دراسة ذات منظور مستقبلي لثمانية نساء اصحاء واللاتي يشتكين من تساقط متكرر خرل وقت الربيع

المرضى وطرق البحث : تمت مراقبة ثمانية من نساء اصحاء يشتكين من تساقط متكرر خلال فصل الربيع لمدة اثني عشر شهرا وذلك لاحتمالية وجود تساقط شعر موسمي قيمت جميع المريضات سريريا واشتمل ذلك على فحص سحب للشعر والذي اجـــري

مرتان شهريا من مناطق متعدده في فروة الراس شملت اعلى الفروه وجوانبها . تم تحضير الشعر بتوصية المشتركات بعدم غسل الشعر لمدة اربع وعشرين ساعة قبل الفحص

النتائج : ان معدل نسبة الشعر في مرحلة التساقط خلال اشهر السنة اظهر نمطا سنويا متمثلا في اقصى نسبه خلال شهر ابريل / نيسان

الاستنتاج : تؤكد هذة النتائج ما ذكره المؤلفون من وجود تغيرات فصلية في نمو شعر الانسان على الرغم من ان الدراسات السابقة قد اظهرت قمة تساقط الشعر في شهر تموز وواحدة اصغر منها في شهر نيسان الا ان هذة الدراسة اظهرت قمة اكبر في تساقط الشعر في شهر نيسان وهذا ربما يعزى الى اختلاف اطوال مدة الفصول بين العراق وبقية البلدان.

Introduction

Evidence that human hair growth varies with season[1] has been advanced by several authors and was reviewed by Saitoh [2] who add some observations on

Japanese subjects. Orentreich [3] reported that three women in New York experienced maximal hair fall in November. Clear and statistically significant data on seasonal variation was provided by a study of 14 young white men in Sheffield, UK, at latitude of 53.4°N [4].

Knowledge of the hair follicle anatomy and the dynamics of hair cycling is substantial. Recognizing the anagen, catagen and telogen phases as well as teloptosis and the hair eclipse phenomenon clearly characterizes the typical hair chronobiology. Physiological modulators include hormones, neuromediators, miscellaneous biomolecules, seasons, micro-inflammation and ageing [5].

Most normal individuals are expected to lose 50-100 hairs from the scalp every day though the exact number of hairs lost per day varies from day to day. This is the physiologic hair loss and is confined to the hairs which have completed their telogen phase. It generally remains unnoticed except in the individuals who keep long hair. During summer and rainy season which seems to be akin to the seasonal loss of hair in some animals [6].

Hormones of the pineal-hypothalamus-pituitary axis coordinate seasonal changes, while androgens regulate most sexual aspects with paradoxically different effects depending on body site. Hormones affect follicular mesenchymal-epithelial interactions altering growing time, dermal papilla size and dermal papilla cell, keratinocyte and melanocyte activity [7].

The proportion of scalp follicles in anagen, as determined by plucking hairs, reached a single peak of over 90% around March and fell steadily to a trough in September .This pattern appeared to be shared by all areas of the scalp.The numbers of shed hairs collected by the subjects closely followed the pattern of activity of the follicles. Hair loss reached a peak around August/September, when the fewest follicles were in anagen. At this time, the average loss of hairs was about 60/day, more than double that during the previous March and compatible with the observed increase from 10 to 20% in the proportion of follicles in telogen [4].

Studies in many species, including sheep, hamsters, mink and ground squirrels [8,9], show that long daylight hours initiate short periods of daily

melatonin secretion by the pineal gland, while short (winter) day-length increases melatonin secretion and stimulates a longer, warmer pelage [10, 7].

Seasonal changes are much less obvious in human beings, where follicle cycles are generally unsynchronized after age one, except in groups of three follicles called Demeijere trios [2]. Regular annual cycles in human scalp and beard and other body hair were only recognized relatively recently [4, 11]. Human beings do retain the ability to respond to altered day-length by changing melatonin, prolactin, and cortisol secretion, but urban environments where light is artificially manipulated suppress these responses [12]. Nevertheless, people in Antarctica [13] and those with seasonal affective disorder maintain melatonin rhythms [14].

Patients and Method

This study was conducted in a private clinic in Baghdad city.Eight women presumably reflecting seasonality in the growth and shedding of hair were selected for this study, based on the following:-

1- Apparently healthy; based on history, clinical examination and investigations.
2- Laboratory investigations undertaken included a routine estimation of hemoglobin, ESR, urinalysis, and any other test indicated by the history or examination.
3- Apparently normal density of hair, i.e. without clinical alopecia
4- Subjects were complaining of hair loss, mainly during spring, recurrent at the same time for many years.
5- Patients were not taking any prescribed medications or over counter drugs more than few days, and those which are not known to cause hair loss

A detailed history was taken from each patient stressing on the age, onset and duration of hair loss, marital state, medical, surgical and family history.

A careful examination of the patients was carried out including hair pull test, performed twice monthly for 12 months. The test was done over different sites of the scalp including the top and the sides. The hair is prepared by instructing the patients not to wash their hair 24 hours before test.

The test is performed by grasping small clump (20-60 hairs) in index, middle and thumb, and pulling gently but with firm pressure. Percentage of hair follicles in a telogen state is worked out by knowing how many hairs were pulled and the number of that came out.

Interpretation

Normal shedding: 10 % or fewer hairs shed.

Active shedding: more than 25% hairs shed.

Results

Hair pull test demonstrated annual periodicity in the growth and shedding of hair, manifested by a maximal proportion of telogen hairs in spring. The mean age of the total group of eight women was 34 years (range: 21-47).

Telogen rates by month of year showed an overall annual periodicity,

manifested by a maximal proportion of telogen hair in April (fig. 1).

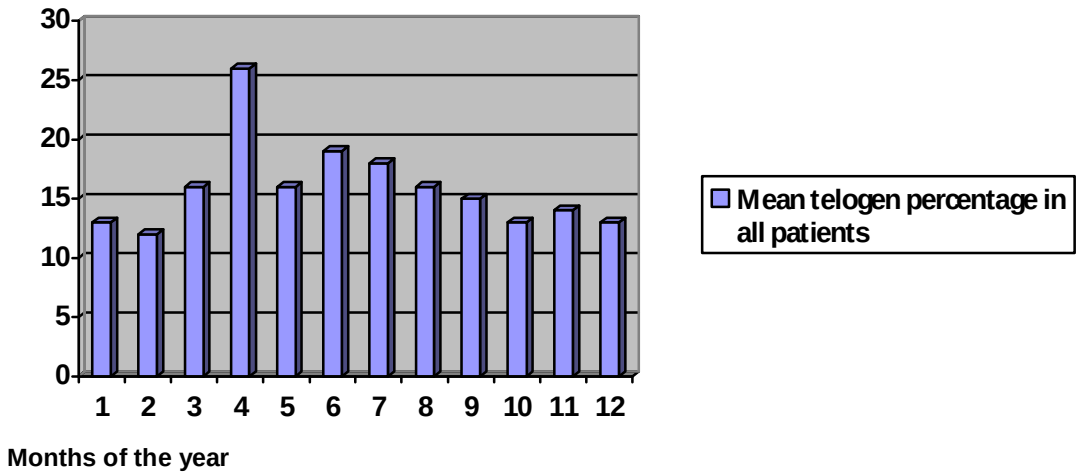

Figure1 Mean telogen percentages, by month of the year (n=8).

Discussion

Hair's importance for insulation and camouflage or human communication means that hairs need to change with season, age or sexual development. Regular, regenerating hair follicle growth cycles produce new hairs which may differ in colour and/or size [7] .Chronobiology governing the hair cycle is a fascinating and complex process. Both the hair growth cycle and the hair shaft growth are coordinated and depend on the interplay of different biological signals and various exogenous stimuli [15].

Each hair follicle processes its own individual control mechanism over the evolution and triggering of the successive phases, though systemic factors, such as the hormonal system, cytokines and growth factors, as well as external factors linked to the environment, toxins, deficiencies of nutrients, vitamins and energy, have influence. In general, the pathological dynamics of hair loss can be related to disorders of hair cycling [16]. Whatever the cause, the follicle tends to behave in a similar way, with telogen effluvium representing the most frequent cause of hair loss [17]. Headington proposed a classification of telogen effluvium into different functional types based on changes in the different phases of the hair cycle. Basically, telogen effluvium results from synchronization phenomena of the hair cycle resulting in increased shedding of hairs from the telogen phase of the cycle, or from shortening of the duration of the anagen phase (without synchronization) underlying androgenetic alopecia[18].

Headington proposed that a delayed telogen release underlies moulting in mammals, and possibly mild telogen effluvia following travel from low-daylight to high-daylight conditions. In this case, hair follicles remain in a prolonged telogen phase rather than being shed and recycling into anagen.When finally teloptosis sets in, again the clinical sign of increased shedding of club hairsis observed [18].

In this study, 8 otherwise healthy women with hair loss presenting between April 1, 2009 and April 31, 2010 had demonstrated the existence

of overall annual periodicity in the growth and shedding of hair, manifested by a maximal proportion of telogen hairs in April. The telogen rate was lowest towards the beginning of January. These results confirm the findings of authors who have formerly demonstrated seasonal changes in human hair growth.

Conclusion

These results confirm the findings of former authors who have indicated seasonal changes in human hair growth, although the previous studies had shown a larger peak in July and a smaller peak in April, this study had shown a larger peak during April. This may be due to difference in seasons lengths between Iraq and other countries.

References

1-Dawber RPR, Van Neste D. Hair science. In: Dawber RPR, Van Neste D, eds. Hair and Scalp Disorders. London: Dunitz, 1995: 20-21.

2-Saitoh M, Uzuka M, Sakamoto M. Human hair cycleJ Invest Dermatol 1970; 54: 65-81.

3-Orentreich N. Scalp hair replacement in man. In: Montagna W, Dobson RL, eds. Advances in Biology of Skin, Vol. IX Hair Growth. Oxford: Pergamon, 1969: 99-108.

4-Randall VA, Ebling FJG. Seasonal changes in human hair growth.Br J Dermatol 1991; 124: 146-51.

5- Marks R, Elsner P. EEMCO guidance for the assessment of hair shedding and alopecia. Skin Pharmacol Physiol. 2004 Mar-Apr;17(2):98-110.

6- Rustom A, Pasricha JS. Causes of diffuse alopecia in women. 1994:60:5:266-271.

7- Randall VA. Hormonal regulation of hair follicles exhibits a biological paradox. Semin Cell Dev Biol. 2007 Apr;18(2):274-85. Epub 2007 Feb 14.

8-Santiago-Moreno J, Lopez-Sebastian A, del Campo A, Gonzalez-Bulnes A, Picazo R, Gomez-Brunet A. Effect of constant- release melatonin implants and prolonged exposure to a long day photoperiod on prolactin secretion and hair growth in mouflon (Ovis gmelini musimon). Domest Anim Endocrinol 2004;26:303-14.

9-Duncan MJ, Goldman BD.Hormonal regulation of the annual pelage color cycle in the Djungarian hamster (Phodopus surgorus) II Role of prolactin. J Exp Zool 1984;230;97-103.

10-Ebling FG, Hale PA, Randall VA. Hormones and hair growth. In: Goldsmith LA, editor. Biochemistry and physiology of the skin. 2nd ed. Oxford: Clarendon Press; `1991. P. 660-90.

11-Courtois M, Loussouarn G, Howseau S, et al. Periodicity in the growth and shedding of hair. Br J Dermatol 1996;134:47-54.

12-Wehr TA. Effect of seasonal changes in daylength on human neuroendocrine function. Horm Res 1998;49:118-24.

13- Yoneyama S, Hashimoto S, Honma K. Seasonal changes of human circadian rhythms in Antarctica. Am J Physiol 1999;227:R1091-7.

14-Wehr TA, Duncan Jr WC, Sher L, Aeschbach D, Schwartz PJ, Turner EH,et al. A circadian signal of change of season in patients with seasonal affective disorder. Arch Gen Psychiatry 2001;58:1115-6.

15-Piérard-Franchimont C, Petit L, Loussouarn G, Saint-Léger D, Piérard

GE. The hair eclipse phenomenon: sharpening the focus on the hair cycle chronobiology.
16-Paus R: Control of the hair cycle and hair diseases as cycling disorders. Curr Opin Dermatol 1996;3:248-258.
17-Kligman AM: Pathologic dynamics of human hair loss. I. Telogen effluvium. Arch Dermatol 1961;83:175-198.
18-Headington JT: Telogen effluvium: new concepts and review. Arch Dermatol 1993; 129:356-363.