Parietal/Occipital Ratio of the Hair Diameter as a Measure of Baldness Severity in Men

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Sir,

A precise measure of the severity of androgenetic alopecia (AGA) is needed for prognostic assessment and clinical trials. In a recent paper (1), hair density failed to answer this need: hair density decreased significantly only when baldness was clinically manifest, namely when class IV of the Hamilton/Norwood scale was attained. We concluded that measuring hair density was no better than using the rough Hamilton/Norwood scale. Since AGA is significantly related to the progressive miniaturization of the hair shaft, it is reasonable to assume that measuring the hair shaft diameter could be a good way of measuring the severity of baldness. In particular, since the occipital area is always spared in AGA, we investigated whether the parietal/occipital ratio of the hair diameter is the best measure of AGA severity.

MATERIAL AND METHODS

Seventy-nine men (15–82 years; average 43.6 years) attending a general dermatology clinic were recruited. They were examined by the same investigator (FV), and the status of the scalp hair was classified in accordance with the Hamilton/Norwood scale. Twenty-five had Hamilton/Norwood class I AGA, 15 class II, 14 class III, 9 class IV, 9 class V and 7 class VI. Two areas were selected on the parietal and occipital zones in all patients.

A maximum of 10 pictures in each area were taken using a video-microscope (Videocap, DS Medica, Milan, Italy) equipped with a ×200 lens, and each image was stored in a computer. The hair shaft diameter of 25–30 hairs per area was then measured a few millimetres from emergence by drawing a perpendicular line across the shaft with dedicated software. The major and minor axes were not distinguished and diameters and parietal/occipital diameter ratios were statistically analysed by AN●VA.

RESULTS

The hair diameters and parietal/occipital ratios are given in Table I. In the occipital area, no significant difference in diameter was found among the various Hamilton/Norwood classes. The total occipital average was 78±9.9 μ (SD), with a median of 78.6 μ and a range between 53.3 and 100.6 μ. There was no statistical correlation with age.

In the parietal area, Hamilton/Norwood classes differed significantly ($F = 18.659$, $p < 0.001$), with diameters diminishing steadily from 77.3 μ in class I to 59.1 μ in class VI. The parietal/occipital ratios were distributed normally and differed significantly among the various classes. They were 1.00 in class I, 1.03 in class II and became 0.84 in class III, 0.76 in class IV, 0.78 in class V and 0.70 in class VI ($F = 18.925$, $p < 0.001$).

Further analysis showed that global difference in the parietal diameter and in the parietal/occipital ratio depended mainly on the difference between classes I–II and classes III–VI. The former group had a mean diameter of 78.6±9.1 μ while classes III–VI had a mean diameter of 60.1±8.7 μ. The parietal/occipital ratio was 1.01±0.11 for classes I–II and 0.78±0.12 for classes III–VI ($F = 82.812$, $p < 0.001$).

DISCUSSION

The Hamilton and other related classifications are used in clinical trials and office practice, but their suitability for research goals is questionable. In particular, it is difficult to distinguish class I from class II, in other words to assess "normality".

Measuring the diameter of the hair shaft is not easy. Problems can arise from the different colour, the oval shape of the shaft, and the point of the shaft at which the measurement is made. In our study, we measured the diameter at the emergence and did not distinguish between major and minor axes, measuring one of them at random. The error we introduced, however, was identical in both occipital and parietal areas and was compensated by calculating the ratio. Light colour did not distort the measurement in any way.

Table I. *Hair diameters (mean±SD) in the parietal and occipital areas of the scalp as a function of Hamilton classes*

Hamilton/Norwood class	Subjects (no.)	Mean age (years)	Parietal diameter (μ)	Occipital diameter (μ)	Parietal/occipital ratio*
I	25	45.6	77.3±9.8	78.1±11.3	1.00±0.1
II	15	35.4	80.8±7.6	79.1±7.6	1.03±0.1
III	14	41.4	64.1±8.3	77.1±9.6	0.84±0.1
IV	9	45.4	57.6±9.9	76.7±11.2	0.76±0.1
V	9	45.7	57.3±5.1	73.4±5.4	0.78±0.1
VI	7	53.3	59.1±10.3	85.0±11.1	0.70±0.1

*The global difference was statistically highly significant: $F = 18.925$, $p < 0.001$. Classes I–II (1.01±0.11) were highly significantly different from classes III–VI (0.78±0.12): $F = 82.812$, $p < 0.001$.

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The average diameters that we determined were 77.3 ± 9.8 μ in class I and 59.1 ± 10.3 μ in class VI on the vertex and substantially agreed with the data of Lee et al. (2) and Rushton et al. (3) showing 82.7 ± 13.8 μ and 61.1 ± 14.4 μ in normal Caucasian males, respectively and 68 ± 2 μ and 54 ± 3 μ in bald subjects, respectively.

Friedel et al. (4) had already shown that hair thickness significantly decreases from stage I (76 μ) through stage IV (56 μ), the anagen diameter doing so only at stage III and onwards. Our results are in perfect agreement, confirming that on the occipital area the hair shaft diameter is unchanged irrespective of severity of baldness, whereas on the parietal area the hair thickness decreases, but only once Hamilton III class is attained.

In conclusion, we favour the opinion that baldness is a complex phenomenon, depending on hair density and, especially, on the diameter of the hair shafts (5, 6). The parietal/occipital ratio of the hair diameter proved to be a better measure than hair density for measuring the severity of AGA in a quantitative way, but failed to discriminate "normal" people. We still need a good tool for transforming our feeling into a numerical value at the very beginning of the disease.

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Vesicant-type Reaction Due to Docetaxel Extravasation

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Sir,

Docetaxel (Taxotere®), belonging to the taxoid family, is a relatively new antineoplastic agent that has sometimes been associated with severe tissue injury after extravasation (1–5). We report on a patient who presented a vesicant-type reaction resulting from extravasation of injected docetaxel.

CASE REPORT

A 65-year-old woman with stage IIIA lung adenocarcinoma had received a right middle- and lower-bilobectomy followed by six cycles of chemotherapy with gemcitabine and cisplatin. Docetaxel was administered because of poor response to the previous therapy. The treatment schedule for each cycle was intravenous infusion of docetaxel for 30 min on days 1, 8 and 15. The dosage was 36 mg/m^2 weekly for each injection. After the first administration on day 1, extravasation of docetaxel into the dorsum of her left hand occurred. Local injection with hydrocortisone and ice packing were administered at that time. The lesion persisted and mild painful swelling was noted afterwards. She received a second injection of docetaxel on the right hand one week later – a smooth process without any complications. An erythematous swelling with tenderness and bulla formation developed on the dorsum of her left hand several hours after the second injection on the other hand. The next day she visited the oncological clinic of our hospital. Under the impression of cellulites, a prescription of cephalexin, acetaminophen and tramadol was given after intravenous injection of cefazolin 1 g. The skin lesion continued to progress and extended to the whole left hand. She presented to us 14 days after the extravasation insult.

On cutaneous examination, one palm-sized, well-demarcated, erythematous and slightly violaceous patch with flaccid bulla formation was noted on the dorsum of her left hand (Fig. 1) extending slightly to the volar aspect of the thenar region. She had neither palpable lymph nodes over the left anticubital fossa and the left axilla nor any systemic toxic signs. The range of motion of the left wrist was limited by tenderness and severe oedema. A vesicant-type reaction of docetaxel extravasation was diagnosed. The patient was instructed to use topical betamethasone valerate cream and chloramphenicol ointment to suppress the inflammation and for wound care.

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