Androgenetic Alopecia Presentation

**Opening Slide:**

Good morning! I realize most of you are probably not awake yet, so I’d like to start this presentation with an interactive case study.

**Slide 1:**

This is my father. He’s a fairly healthy man, regularly exercises, manages his weight, and maintains a healthy diet. However, he does suffer from a terrible disease, and I’d like you all to take a careful look at his picture and try to figure out what’s wrong with him. Some clues: he is 51 years old, has a family history of high blood pressure and high cholesterol, and he is south east Asian. Anyone have any ideas? No? Let’s zoom in on the picture.

**Slide 2:**

Still no ideas? Let’s go in a bit further.

**Slide 3:**

Now, for those of you have caught on, let’s not ruin the punch line of my joke here. But for the rest of you who haven’t figured out, it’s kind of sad given that this terrible disease my father suffers from also affects up to 50% of men and 3-6% of women by the time they’re 50. This brutal ailment is none other than…

**Title Slide:**

Androgenetic Alopecia…commonly known as male pattern baldness.

**Slide 4:**

Now I think it’s fair to say that we’re all pretty familiar with balding, but what’s interesting is that it’s not just a matter of hair disappearing into thin air. So our hair follicles go through a continuous cycle of growing and resting. Anagen (the growing stage), lasts for about 2-7 years. Then comes catagen, which is about 2 weeks of programmed cell death in which almost everything is shut down, and finally we have telogen which lasts about 100 days and this is where the hair actually matures and is then shed. And so then the cycle continues, and because anagen lasts 2-7 years and telogen in which about 100 hairs are shed a day lasts only 100 days, we normally get a constant covering on our scalp. But, balding occurs when anagen continues to be shortened in cycles and the follicle actually miniaturizes, and so what you get is successively shorter and finer hairs until your follicles aren’t producing anything at all, except for what they call “vellus” hairs.

**Slide 5:**

And as a result, what we see is this regressive pattern, where an M shape is usually seen while there might be a little balding in the back, and progressively the hairline deteriorates until most men are left with what I like to call the croissant. Now, those of you with hair are probably asking “Okay, why does this happen?” and those of you without hair or those that are going to be without hair are probably asking “FOR THE LOVE OF GOD WHY IS THIS HAPPENING TO ME??”. I’ll get to the emotions later, but the reason that I chose this topic was because there’s no definite answer. We do not know exactly why it happens.

**Slide 6:**

And that’s pretty surprising isn’t it? Such a simple thing has no answer. We know it’s linked to genetics and hormones. Now, most of you have heard the “if you mother’s father was bald you’ll be bald too”, and while that might have some merit to it, the truth is that it’s an autosomal gene, which is backed up by the strong connection of baldness between father and sons, and it’s also most likely polygenic due to the number of factors involved with it. But we don’t know specifically where all of these are and just how many loci affect male pattern baldness. We do however know a little bit more about the hormone side of things.

**Slide 7:**

It was actually as far back as more than 2000 years ago when Hippocrates noted that children and men who have been castrated did not go bald. This was on the right track for as it turns out, the culprit in the collective sadness of us balding or bald individuals is a little sex hormone called dihydrotestosterone or DHT. It’s actually a metabolized version of testosterone via an enzyme called 5alpha-reductase, except DHT is 5 times more potent than testosterone because of its higher affinity for the androgen receptor in cells. Now this is great and all, but how exactly does DHT induce the miniaturization of follicles? We don’t know. All we know is that there’s a higher concentration of DHT on males or females that suffer from balding than those that don’t. Females are a little better off because they higher concentrations of aromatase, an enzyme that converts testosterone to estradiol before it can be made into DHT. Regardless, the best part of all this though? Everywhere else in the body, DHT actually induces hair growth, it’s what courses through our bodies during puberty, and so this paradox is what’s stumped researches the most. So, in the decades upon decades of scientific innovation, the most we still know about male pattern baldness is that it happens.

**Slide 8:**

At this point, most of you are probably like “Ok, it’s a dead end, big deal, it’s just balding”. I mean, in our society, we’ve kind of just accepted balding as a part of life, a part of growing, and a part of aging. Now this might come as a shock to you, but as it turns out, most people who are bald or are balding don’t take it very well. In women suffering from balding especially, we see 55% of them suffering from depression, and in men there are huge self-esteem issues. 78% of men suffer from some kind of anxiety and 22% become more hostile or angry. Image is essential in our lives, props to those people who don’t care but the majority of us do, and that’s part of the reason we should care about further researching into this issue, because at this point, the treatment options aren’t that great.

**Slide 9:**

In fact, I wouldn’t call them treatments so much as a managements. The two main ones are the topical ointment Minoxidil, and the oral pill Finasteride. What’s great about Minoxidil is that it was actually originally an antihypertensive medication that had a surprisingly wonderful side-effect of promoting hair growth, and this kind of reveals again just how little we know about the mechanism of hair loss. Finasteride is a little bit less magical because it actually blocks 5alpha-reductase from converting testosterone to DHT. In the case neither of those show results, Laser Light Combs are available – they tend to promote some hair growth, but not as effectively as Minoxidil or Finasteride. There are a bunch of other treatments that are in development or just kind of hit or miss, most of them are antiandrogens or estrogen supplements, but once again, random things pop up and we find that melatonin – which our body produces to regulate sleep – can also promote hair growth. Then of course there’s Transplant surgery, which is taking a strip of hair, separating the follicles, and then implanting each one into the desired area. The issue with all of these “managements” is that they have a limited effect, which is why in one article the author recommends physicians to “manage expectations” because in reality, the medications will promote a limited increase in hair density, but it won’t bring back a full head of hair. And another issue is that they’re not long term solutions. If you don’t continue taking these medications, your hair will just start falling out again. And this becomes a big deal because insurance doesn’t cover the cost of what they view as cosmetics, and so over the course of a lifetime things could get pretty pricey.

**Slide 10:**

But pattern baldness may not just be a cosmetic concern. For years there’s been a link drawn between male pattern baldness and prostate cancer (more specifically benign prostatic hyperplasia or BPH). Studies have shown that bald men have a 69% greater chance of developing prostate cancer, and that the more severe and earlier you get hair loss, the higher the risk of a more advanced cancer there is. The culprit in both cases is again DHT, which is why the treatment of prostate cancer is a higher dose of oral Finasteride. Aside from prostate cancer, pattern baldness in both men and women have been linked to a higher occurrence of mortality from diabetes mellitus and heart disease. Now, nobody’s saying that pattern baldness causes either of those diseases or that by curing balding we’ll save ourselves from diabetes or heart disease, but it can certainly be used as a marker for physicians when they’re identifying patients with these diseases. And of course, the most profound effect is psychological. Most people accept it, but there’s always that nagging sense of self-consciousness. I mean, I wish it could be like it was thousands of years ago, when Aristotle proclaimed that baldness was a sign of masculinity. I don’t expect us to revert back to togas any time soon, so I hope that researchers make a push to understand the mechanism behind male and female pattern baldness. DHT seems to be the key here; if we can figure out why it affects follicles so differently throughout the body, we might have a cure on our hands. But in all honesty, it’s probably not that simple because it really is such a complex network of hormones and genes. I remain hopeful though…if not for my receding hairline, then at least for the generations of my bald progeny that will curse my name and my genes in the years to come. Thank you.