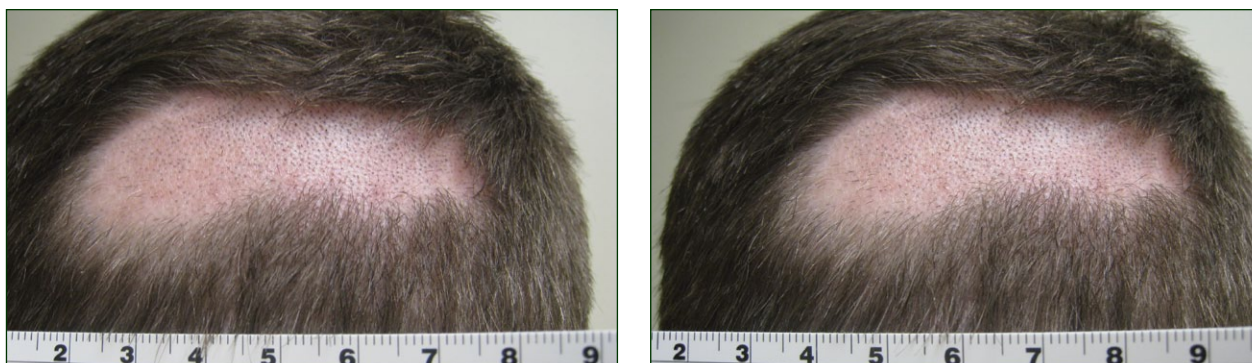


## What Is Your Diagnosis?



A 28-year-old man underwent an uncomplicated modified Ravitch procedure for elective repair of asymmetric pectus carinatum. The patient was placed under endotracheal anesthesia and remained in the supine position for the 5-hour operation with his head supported by a pad. Temperature and blood pressure levels were within reference range throughout the operation, and his blood loss was 50 mL. Five hours after the operation, he reported scalp swelling and tenderness around the occiput, and his primary care team noted edema localized to a rectangular region measuring 3×8 cm, with the affected area remaining similar in size over the intervening days. Dermatology was consulted on postoperative day 3. A localized 3×8-cm band of indurated and edematous skin with serous exudate and tenderness on palpation was noted on the occipital scalp. Overlying hair remained in place. Local wound care instructions were provided to the patient and his primary care team, and a 2-week outpatient follow-up was scheduled. On follow-up, the edema and induration had fully resolved; however, a well-demarcated patch of alopecia measuring 3×7 cm had developed on the affected scalp (left and right). Tufts of telogen hairs could be easily removed from the edges of the alopecic patch. Minoxidil solution 2% applied twice daily to the affected area was recommended, and at 1-month follow-up, fine velluslike hairs were present throughout the affected patch.

PLEASE TURN TO PAGE 232 FOR DISCUSSION

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## The Diagnosis: Pressure Alopecia



**P**ressure alopecia is an uncommon condition most frequently described in patients who undergo lengthy operations lasting 6 hours or longer. Most cases occur following gynecologic, cardiothoracic, gastrointestinal, or reconstructive surgical procedures. There is no age, gender, or ethnic predilection.

Resultant alopecia is thought to be secondary to local tissue hypoxia and ischemic vascular changes that develop because of continuous pressure to selected regions of the scalp. This ischemia can be exacerbated by the use of intraoperative adjuncts such as inadequately cushioned metal headrests,<sup>1</sup> procedure-dependent head straps, prolonged endotracheal intubation, and the Trendelenburg position. The degree of alopecia correlates with the length of the surgical procedure as well as the amount of exerted pressure.<sup>2,3</sup> Intraoperative hypotension, considerable blood loss, and hypothermia can further exacerbate resultant ischemia.<sup>4</sup>

Early signs of pressure-induced necrosis are seen as edema and induration, often with overlying crusting. Erosions and scarring ultimately may result, which can lead to the development of cicatricial alopecia; however, most cases resolve with full hair regrowth and no scarring. The duration of tissue ischemia appears to be the most striking variable to determine the permanence of the condition.

Early histologic findings reveal dermal vascular thrombosis and inflammation. Alopecia is gradual over the first month and generally results from shedding of anagen hairs. Biopsies in the first month reveal dermal fibrosis and chronic inflammation, often coupled with vascular necrosis. A relative paucity of follicles is present with the preponderance of

hairs being telogen or catagen, secondary to the loss of mainly anagen hairs. Trichomalacia also may be present, such that disintegrated hair shafts, short and broken hairs, and clumps of pigmentation or hair casts may be appreciated.<sup>5</sup>

Treatment is not necessarily indicated, and several case reports have indicated complete spontaneous regrowth within several months.<sup>1</sup> Topical corticosteroids and minoxidil are not of proven efficacy,<sup>3</sup> and acutely topical corticosteroids may worsen tissue ischemia because of their propensity to cause local vasoconstriction. Knowledge of the condition and proper intraoperative positioning of the patient is essential for prevention.

Awareness of pressure alopecia as a postoperative complication is crucial. During longer operations, when possible, the patient should be repositioned or adequately protected from lengthy scalp pressure with the use of positional devices or padding.

### REFERENCES

1. Bruce IA, Simmons MA, Hampal S. 'Horseshoe-shaped' post-operative alopecia following lengthy head and neck surgery. *J Laryngol Otol.* 2002;116:230-232.
2. Dominguez E, Eslinger MR, McCord SV. Postoperative (pressure) alopecia: report of a case after elective cosmetic surgery. *Anesth Analg.* 1999;89:1062-1063.
3. Domínguez-Auñón JD, García-Arpa M, Pérez-Suárez B, et al. Pressure alopecia. *Int J Dermatol.* 2004;43:928-930.
4. Regev E, Goldan O, Orenstein A, et al. Permanent pressure alopecia after microsurgical breast reconstruction. *Plast Reconstr Surg.* 2006;117:2095-2096.
5. Sperling LC. *The Encyclopedia of Visual Medicine Series: An Atlas of Hair Pathology With Clinical Correlations.* Boca Raton, FL: Parthenon Publishing; 2003.