

Nutritional Supplementation in a Pediatric Patient with Pituitary Adenocarcinoma

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Case Report

EW is a 8 year old female who weighs 92 pounds and stands 4'11 tall. Her past medical history is significant for juvenile onset diabetes insipidus for which DDAVP nasal spray is required. Presently, she complains of stomach ache and visual disturbances.

The mother reports the child has been losing weight and has a decreased appetite. Upon evaluation, the pediatric oncologist's assessment includes abnormal bowel sounds and abnormal growth to age maturation. In addition, she is diagnosed with a pituitary adenocarcinoma with optical involvement.

Chemotherapy regimen administered included Cisplatin , VP-16, Etoposide, and Mesna for 9 weeks as ordered by the oncologist. In addition, she received neupogen, hydrocortef, colace, bactrim, and lavoxel. At 12 weeks, she underwent fractionated stereo radiotherapy. Nutritional supplementation with Propax was initiated on week 2 of the initial therapy.

Initially, after supplementation, she complained of fluctuating stomach pain and occasional diarrhea reported as variable in stool consistency and described as multicolored. Stool culture reported positive for amoeba fragella, 4+ candida, and many blastosis hominis.

After an initial period of quiescence, her bowel sounds increased, appetite patterns changed to increased hunger and increased food intake. Pediatrician concluded her rate of growth has increased to above baseline and her dental development (teeth maturation) has also increased.

Introduction

Pituitary neoplasms account for 10 - 15% of intracranial neoplasms. They can produce both excess and deficiency in anterior pituitary hormones or problems related to tumoral invasion into surrounding tissues.

Historically, tumors may be classified as basophilic, acidophilic, or chromophilic based on hematoxylin and eosin staining. Corticotroph adenomas are usually basophilic, densely granulated prolactin-secreting tumors are acidophilic, and the majority of prolactinomas, sparsely granulated GH-secreting tumors, TSH-secreting tumors, and gonadotropin secreting tumors and non-secreting tumors are chromotrophic. However, since little insight is given into hormone production, current classification is based on immunohistochemical staining: corticotroph (ACTH and POMC), somatotroph (GH), thyrotroph (TSH), gonadotroph (LH, FSH, and their subunits), lactotroph (prolactin), and null cell. Tumors may

also be classified according to size and invasive characteristics: microadenomas are < 10mm and macroadenomas are \geq 10mm. (HARRISONS)

Discussion

Ideal therapy corrects hormonal hypersecretion without producing hypopituitarism and shrinks tumor mass without morbidity or mortality. Therapy for microadenomas may achieve for both these goals while treatment for macroadenomas is usually less successful. Medical treatment includes bromocriptine; surgical intervention may be required to correct visual abnormalities; and radiation may be useful in prohibiting tumor growth.

Radiation therapy usually consists of 4500 cGy at 1.8 Gy per day over 5 weeks using rotational therapy. The Gamma knife may be utilized to deliver 4000 - 10,000 cGy through several hundred portals in a single session. Heavy-particle therapy with proton beam or alpha particles may be effective in treating secretory adenomas, but response to treatment is slow.

Pediatric neurologic tumors may be treated with one of 3 chemotherapeutic regimens: PVC (Lomustine, Procarbazine, and Vincristine), PVP (Cisplatin and Etoposide), and PVM26 (Cisplatin and Teniposide). EW was given the PVP regimen. Standard dosing regimen includes cisplatin 40mg/m² over 1 hr and etoposide 100mg/m² over 1 hour both administered on days 1 thru 5.

Etoposide, a semi-synthetic derivative of podophyllotoxin, inhibits DNA topoisomerase II and as a result prohibits DNA synthesis. Myelosuppression is etoposide's dose-limiting toxicity. Episodes of nausea and vomiting are considered mild to moderate. However, mucositis is also considered to be a dose-limiting toxicity. Additionally, anorexia diarrhea, constipation, and abdominal pain are commonly reported. Dermatologic and hypersensitivity reactions are also reported.

Cisplatin is a heavy metal platinum complex which acts as a alkylating agent that binds and cross links DNA and as a result prevents protein synthesis. The major side effects include a dose-limiting myelosuppression. Both acute and delayed emesis is reported, both of which may be considered severe. Delayed nausea may persist for up to 5 days. In addition, persistent anorexia and taste alterations may prevail. Cisplatin also exerts a severe dose-dependent / limiting renal toxicity, pulmonary fibrosis, cardiotoxicity, and neuropathies (Baltzer).

Myelosuppressive episodes experienced by EW were probably partially avoided by the administration of neupogen, a granulocyte stimulating factor. Severe gastrointestinal sequela may have been preempted due to the administration of Mesna. The role of nutritional supplementation in gastrointestinal distress is controversial. However, the protective effects of fat-soluble and other natural antioxidants are well known⁽⁸⁾. These antioxidant defenses are important in determining immune cell integrity and functionality of membrane lipids, cellular proteins, and nucleic acids. Additionally, antioxidants are believed to control signal transduction and gene expression in immune cells⁽⁹⁾. There are several stages where antioxi-

dants may control the progression and malignancy of disease. Antioxidants may also provide protection even when cancer-infected viral activity is present.

Therefore, dietary introduction of these nutrients may stimulate host immunological defenses and damage malignant cells directly by cycling with consequent oxygen radical production. The unique dietary supplement, Propax, addresses the nutritional concerns of oncology patients without resorting to mega dosing as in many immunosuppressive types of disease states. The formulation is composed of the complete antioxidant group and trace minerals, combined with water-soluble nutrients and essential fatty acids. To aid in the production of ATP, the formulation also includes phospholipids & creatinine, creatinine phosphate, tyrosine, and alpha glutarate. Finally, the formulation utilizes a unique delivery system that mimics the way the body utilizes nutrients⁽¹⁰⁾. These properties may be of benefit in treating the gastrointestinal side effects commonly seen in patients with immunosuppressive diseases who undergo treatment with chemotherapy and / or radiation. Although, well-controlled, blinded, clinical studies are required to draw definitive conclusions on the effectiveness of nutritional supplements like Propax, it may correlate with the positive results for decreased gastrointestinal symptoms experienced by the patient studied.

References

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