**ABSTRACT**

Objectives: 1. Describe the entity of Tumarkin otolithic crisis in the elderly. 2. Assess the potential ramifications of drop attacks in the geriatric population.

Methods: Retrospective review of cases from September 1997 to January 2007 from a tertiary medical center of all patients seventy years old and over diagnosed with Tumarkin drop attacks accompanying Meniere’s disease or delayed endolymphatic hydrops that underwent transmastoid obliteration with caloric evaluation of labyrinthine function. Disease duration prior to surgery, number and complications from prospective drop attacks, patient age at time of surgery, preoperative vestibular and audiometric testing results, including resolution of drop attacks and postoperative morbidity and mortality were noted.

Results: Eight patients (age 70 to 94) were identified with a diagnosis of Tumarkin drop attacks accompanying either definitive Meniere’s disease (n=5) or delayed endolymphatic hydrops (n=3) who underwent transmastoid obliteration with caloric evaluation of labyrinthine function. All patients demonstrated preoperative non-serviceable hearing of the operated ear and most had ipsilateral caloric paresis on ENG. Two patients suffered hip fractures preoperatively related to drop attacks. Patients with documented history of hip surgery up to 94 months prior to surgery had fractures to 94 months. No patients suffered any postoperative complications. Surgical obliteration with caloric evaluation of labyrinthine function and there were no mortalities. No patient suffered another drop attack after transmastoid obliteration.

Conclusions: Tumarkin drop attacks are a dangerous entity as they strike without warning, and may cause patients to suffer secondary injuries. This danger is magnified in the geriatric population with comorbid conditions such as osteoporosis which increase the risk of more significant secondary injuries such as the hip fractures demonstrated herein. The Tumarkin otolithic crisis is thought to arise in the peripheral vestibular system, obliteration with transmastoid obliteration is curative.

**Introduction**

In 1939, Tumarkin described drop attacks in a patient that he attributed to the vestibular system4. Drop attacks in association with Meniere’s disease have been considered as one of the most perplexing diagnoses in otology. These episodes of falling have been attributed by an erroneous notion of falling in a fall without associated loss of consciousness. The typical rotatory vertigo of Meniere’s disease does not accompany these falls and patients recover balance function immediately and are quickly able to return to activities.

Falls in the elderly population can cause substantial morbidity and mortality1. One percent of falls in the general geriatric population can lead to hip fractures, of which one fifth of victims die within six months2. Approximately five percent of fallers break a bone and another five percent suffer a severe soft tissue injury3. With the substantial morbidity and mortality of elderly fall sufferers in mind, we examine the entity of Tumarkin otolithic crisis in the elderly population.

**Methods**

The current investigation was conducted as a retrospective review of cases from a tertiary medical center of all patients seventy years old and over diagnosed with Tumarkin drop attacks accompanying Meniere’s disease or delayed endolymphatic hydrops that underwent transmastoid obliteration with caloric evaluation of labyrinthine function by the senior author from September 1997 to January 2007. Eight patients were identified for review, three of which have been included in a previous report1. Elements of each patient’s clinical course including duration of disease prior to surgery, number and complications from prospective drop attacks, patient age at time of surgery, preoperative vestibular and audiometric testing results, and postoperative outcomes including resolution of drop attacks and postoperative morbidity and mortality were recorded.

**Results**

Eight patients were identified age seventy to eighty-four, with a diagnosis of definite Meniere’s disease (five patients) or delayed endolymphatic hydrops (three patients) and a history of Tumarkin otolithic crisis (see table). All patients had poor hearing in the operative ear with pure tone averages ranging from 60 to 95dB and word recognition scores from 90% to unacceptable. Caloric responses in the affected ear were reduced in seven out of the eight patients. The number of drop attacks each patient experienced preoperatively ranged from two to thirty.

Two patients experienced significant injuries from their drop attacks. One patient (patient 5) experienced two drop attacks preoperatively; the first drop attack was without injury, however with her second attack the patient sustained a hip fracture which required surgical intervention. Upon recovering from her hip surgery, the patient underwent successful transmastoid obliteration and had no further drop attacks subsequently. Another patient (patient 8), experienced four falls preoperatively, and on one occasion she sustained a hip fracture and a nasal hemorrhage. After surgical intervention for her injuries, she underwent transmastoid obliteration and had no further drop attacks.

Follow up ranged from one to ninety-two months, with all patients experiencing resolution of their drop attacks. One patient experienced a cerebrovascular accident exactly one month after their transmastoid obliteration from which she experienced unilateral weakness of the upper and lower extremities. She experienced significant weakness for 6 months.

As this event occurred a full month after surgery, in relation to intraoperative events is unlikely.

**Discussion**

Tumarkin otolithic crisis is characterized by sudden drop attacks without loss of consciousness that usually strike without warning and may occur in patients with endolymphatic hydrops (usually secondary to Meniere’s disease). Drop attacks can be a dangerous entity as they have the potential for serious bodily injury; this potential is heightened in the elderly population who, compared to their younger counterparts, are at greater risk for bodily injury from falls.

In this study, we report on six patients, two patients experienced severe morbidity secondary to episodes of Tumarkin otolithic crisis. This was manifested as hip fractures in both patients, one patient also sustained a nasal fracture. Fortunately these patients were able to recover from their injuries. However, these injuries highlight the danger of Tumarkin falls in the elderly population. Additionally, even more dangerous morbidities (such as subdural hematomas) or mortalities secondary to an injury could potentially result from Tumarkin otolithic crisis in this population.

Jansen and Russell in 1995 reported on successful transmastoid obliteration on six patients with a median follow up time of seventy years old and over diagnosed with Tumarkin drop attacks ranging from two to eighty-four years. In the current series of eight patients treated for Tumarkin drop attacks by transmastoid labyrinthectomy, all patients experienced resolution of their drop attacks after surgery.

We conclude that surgical vestibular ablation is effective in eliminating future episodes of Tumarkin otolithic crisis. Careful consideration should be given for surgical management of Tumarkin otolithic crisis in the elderly population to avoid the potential attendant morbidity of drop attacks in this population.

**Conclusions**

1. Tumarkin otolithic crisis is characterized by the sudden onset of a fall as if pushed by an external force without loss of consciousness in patients with Meniere’s disease or delayed endolymphatic hydrops.

2. The geriatric population is at greater risk compared with the general population for secondary morbidity from falls.

3. Surgical vestibular ablation is an effective treatment for Tumarkin otolithic crisis.

4. Early surgical vestibular ablation should be considered in the geriatric population to prevent morbidity and potentially mortality from falls.