Tumarkin Drop Attacks in the Geriatric Population

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ABSTRACT

Objectives:

1. Describe the entity of Tumarkin otolithic crisis in the elderly.
2. Address the potential ramifications of drop attacks in the geriatric population.
3. Suggest treatment strategies for patients with drop attacks accompanying delayed endolymphatic hydrops or Meniere's disease.

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 labyrinthectomy. Duration of disease prior to surgery, number and complications from preoperative drop attacks, patient age at time of surgery, preoperative vestibular and audiometric testing results, and postoperative outcomes including resolution of drop attacks and perioperative morbidity and mortality were examined.

Results:

Eight patients (age 70 to 84) 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 labyrinthectomy with curative intent. All patients demonstrated preoperative non-serviceable hearing out of the operative ear and most had ipsilateral caloric paresis on ENG. Two patients suffered hip fractures preoperatively related to drop attacks. Patients with documented follow up postoperatively ranged from 1 to 94 months. No patients suffered any postoperative complications secondary to transmastoid labyrinthectomy and there were no mortalities. No patient suffered another drop attack after transmastoid labyrinthectomy.

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 like osteoporosis which increase the risk of more significant secondary injuries such as the hip fractures demonstrated herein. As 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 otolithic system[8]. Drop attacks in association with Meniere's disease have come to bear his name. These episodes are characterized by the sensation of being pushed by an external force resulting 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 mortality[7]. One percent of falls in the general geriatric population can lead to hip fractures, of which one fifth of victims die within six months[6,7]. Approximately five percent of fallers break a bone and another five percent suffer a serious soft tissue injury[6]. 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 labyrinthectomy 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 report[3]. Elements of each patients clinical course including duration of disease prior to surgery, number and complications from preoperative drop attacks, patient age at time of surgery, preoperative vestibular and audiometric testing results, and postoperative outcomes including resolution of drop attacks and perioperative morbidity and mortality were recorded.

Results

Eight patients were identified aged 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 50% to undetectable. 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 labyrinthectomy 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 fracture. After surgical intervention for her injuries, she underwent transmastoid labyrinthectomy 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 her transmastoid labyrinthectomy from which she experienced unilateral weakness of the upper and lower extremities. She experienced significant recovery of function over time. As this event occurred a full month after surgery, its relation to intraoperative events is unlikely. No other complications occurred.

Table

Subject number	Age/ Sex	Diagnosis	PTA/WRS (preoperative)	ENG/ Calorics	Number of falls preop	Disease duration	Follow up (months)	Postoperative complications	Falls postop
1	70M	DEH	65dB/50%	Absent calorics on right	Unclear	10 years hearing loss, 3 years vertigo	92	None	0
2	79F	MD	76dB/40%	36% left paresis	5	7 years	1	None	0
3	75M	DEH	95 dB/cnt	35% left paresis	30	10 years hearing loss, 1 year vertigo	18	None	0
4	77F	DEH	75dB/cnt	25% left paresis	8	11 years hearing loss, 7 years vertigo	4	None	0
5	82F	MD	68dB/40%	normal	2, *broken hip*	3 years	40	None	0
6	83M	MD	82dB/cnt	42% left paresis	5	3 years	42	None	0
7	81F	MD	80dB/cnt	85% left paresis	3	19 years	20	CVA 1 month after surgery	0
8	84F	MD	60dB/40%	44% left paresis	4, *broken hip and nose*	2 years	14	None	0

Table legend
DEH = delayed endolymphatic hydrops
MD = Meniere's disease
PTA = pure tone average
WRS = word recognition score
cnt = could not test
ENG = electronystagmogram
CVA = cerebrovascular accident

Discussion

Tumarkin otolithic crisis is characterized by sudden drop attacks without loss of consciousness that usually strike without warning and occur in patients with endolymphatic hydrops (usually secondary to Meniere's disease)[2]. Drop attacks can be a dangerous entity as they have the potential for serious bodily injury; this potential is heightened in the elderly population whom, compared to their younger counterparts, are at greater risk for bodily injury from falls.

In the current series, two patients experienced serious 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.

Janzen and Russell in 1988 reported on six patients with Tumarkin otolithic crisis, each patient experienced a total of one to five falls. They reported the natural history of disease in these patients led to resolution of the falls within six months of the onset of the first fall[4]. In a study examining twelve patients with Tumarkin otolithic crisis secondary to Meniere's disease or delayed endolymphatic hydrops, Baloh et al reported that the majority of their patients (ten out of twelve) experienced resolution of their falls within one year of onset[1]. The remaining two patients continued to experience falls beyond one year. In their series, patients experienced a total number of drop attacks ranging from two to eighteen. In the current series, patients experienced between two and thirty episodes of Tumarkin otolithic crisis in the preoperative period; after surgery, no further falls occurred.

Management of patients with Tumarkin otolithic crisis has been variably reported in the literature. In the report by Baloh et al, eleven of their twelve patients chose conservative management with low salt diet and vestibular suppressant medications and one patient underwent vestibular nerve section. The surgical patient had no further drop attacks. The majority of their patients had no further attacks beyond one year from the onset of the falls[1]. Janzen and Russell similarly suggested conservative management, given their finding that all patients in their series experienced no further falls six months after onset, however, they noted that vestibular suppressants did not prevent future Tumarkin otolithic crisis[4]. They suggested surgical intervention would be indicated for incapacitation by the frequency of attacks or for safety issues.

Black et al reported on eleven patients with Tumarkin otolithic crisis. Nine patients underwent surgical management via transmastoid labyrinthectomy, vestibular nerve section, or endolymphatic shunt. They found that all patients who underwent transmastoid labyrinthectomy or vestibular nerve section had resolution of their falls. They found endolymphatic shunt to be ineffective for the treatment of Tumarkin otolithic crisis, with two of three patients undergoing this procedure requiring subsequent vestibular nerve section[2]. In Janzen and Russell's series, two of their six patients had already had prior endolymphatic shunt surgeries before presenting with Tumarkin otolithic crisis, leading them to conclude that endolymphatic shunt surgery was ineffective for preventing future attacks[4]. Kaasinen et al found a cure rate of Tumarkin otolithic crisis in 60% of patients treated with intratympanic gentamicin[5]. In a report on seven patients who underwent surgical vestibular ablation (five transmastoid labyrinthectomies and two vestibular nerve sections) for Tumarkin otolithic crisis, all patients experienced resolution of their drop attacks after surgery[3].

In the current series of eight patients treated for Tumarkin drop attacks by transmastoid labyrinthectomy, all eight 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 a consideration in the geriatric population to prevent morbidity and potentially mortality from falls.

References

1. Baloh RW, Jacobson K, Winder T. Drop attacks with Meniere's syndrome. Ann Neurol. 1990 Sept;28(3):384-7.
2. Black FO, Effron MZ, Burns DS. Diagnosis and management of drop attacks of vestibular origin: Tumarkin's otolithic crisis. Otolaryngol Head Neck Surg. 1982 Mar-Apr;90(2):256-62.
3. Ishiyama G, Ishiyama A, Jacobson K, Baloh RW. Drop attacks in older patients secondary to an otologic cause. Neurology. 2001 Sep 25;57(6):1103-6.
4. Janzen VD, Russell RD. Conservative management of Tumarkin's otolithic crisis, J Otolaryngol. 1988 Dec;17(7):359-61.
5. Kaasinen S, Pyykko I, Ishizaki H, Aalto H. Intratympanic gentamicin in Meniere's disease. Acta Otolaryngol. 1998 Jun;118(3):294-8.
6. Kennedy TE, Coppard LC. The prevention of falls in later life. Dan Med Bull. 1987; 34(Suppl):1-24.
7. Studenski S, Wolter L. Instability and Falls. In: Duthie EH, Katz PR, editors. Practice of Geriatrics – 3rd Ed. 1998. W.B. Saunders Co.
8. Tumarkin A. The otolithic catastrophe: a new syndrome. BMJ. 1936;1:175-177.

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