

be studied before dilation is approached, regardless of the underlying pathology.

Rami Hawari, M.D.

Digestive Disease Center  
Huntsville, AL 35801  
rahawari@gmail.com

1. Shafi MA, Eisien GE, Al-Kawas FH, Benjamin SB. Increased risk of esophageal perforation with dilatation in patients with multiple esophageal webs (feline esophagus): a case control study. *Gastrointest Endosc* 1997;45:56. abstract.

## More on Thunderstorms and iPods

**TO THE EDITOR:** Heffernan et al. (July 12 issue),<sup>1</sup> in their letter to the editor about thunderstorms and iPods, and others<sup>2</sup> make contentions about lightning that require correction. There is no evidence that a metal or electronic apparatus worn or carried on the body, whether on the head or elsewhere, makes a person more attractive to lightning. Eardrum perforation is the norm in lightning-related injury, not a sign of any special effect due to an iPod.

Once lightning strikes, metal will be incorporated into the pathway of the current. Andrews<sup>3</sup> notes that cranial orifices are likely entry points for lightning current — with known consequences. The iPod merely assists a natural phenomenon.

Furthermore, skin impedance has a large capacitive component, and thus, there is zero impedance at the beginning of the passage of current. Charging of this capacitance leads to flashover, after which current will not re-enter the body (which is analogous to current behavior in wood<sup>4</sup>), and internal current will diminish monotonically.

A tree is not a safe shelter from lightning; National Lightning Safety Awareness Week promotes the concept that “no place outside is safe when thunderstorms are in the area” ([www.lightningsafety.noaa.gov/week.htm](http://www.lightningsafety.noaa.gov/week.htm)). An iPod may prevent the user from hearing thunder, which is a primary warning of lightning danger. It is ironic that in our study of telephone-mediated lightning strikes,<sup>5</sup> perforated eardrums that healed naturally performed better in the long term than those that were surgically corrected.

Chris Andrews, Ph.D., M.B., B.S.

Auscare Medical Centre  
Indooroopilly 4068, Australia

Mary Ann Cooper, M.D.

University of Illinois  
Chicago, IL 60612-7354

1. Heffernan EJ, Munk PL, Louis LJ. Thunderstorms and iPods — not a good idea. *N Engl J Med* 2007;357:198-9.

2. Esprit S, Kothari P, Dhillon R. Injury from lightning strike while using mobile phone. *BMJ* 2006;332:1513.

3. Andrews C. Structural changes after lightning strike, with special emphasis on special sense orifices as portals of entry. *Semin Neurol* 1995;15:296-303.

4. Darveniza M. Electrical properties of wood and line design. Brisbane, Australia: University of Queensland Press, 1978.

5. Andrews CJ, Cooper MA, Darveniza M, Mackerras D. Lightning injuries: electrical, medical, and legal aspects. Boca Raton, FL: CRC Press, 1992.

**TO THE EDITOR:** Heffernan et al. do not consider the possibility that the iPod wires conducted electricity away from the patient's ears, preventing further otologic injury.

Electricity preferentially flows through tissues of high conductance. The temporal bone and air in the external auditory canals are highly resistant. The worst burns incurred from the iPod wires occurred away from the ear on the neck (Fig. 1). If current had entered the body, it would have done so at the neck, not the ear.

We are the otolaryngologists who cared for the patient described by Heffernan et al., and our clinical findings suggest that blast effect and acoustic trauma, not electric shock, were responsible for his bilateral tympanic-membrane perforation.



**Figure 1.** Burns along the Distribution of the iPod Wires, with Relative Sparing of the Ear.

rations, incudomalleolar dislocations, and sensorineural hearing loss. There were no burns in the ear canals or on the tympanic membranes, and scarring was not encountered during tympanoplasty. The patient was conscious at the scene and had no intracranial injuries, findings that would have been unlikely had lightning entered his head.

Underreporting and advances in imaging, rather than the effect of the iPod, probably explain why ossicular dislocations are not described in lightning strikes.

Paul T. Mick, M.D.

Patricia K. Lee, M.D.

Neil Longridge, M.D.

University of British Columbia  
Vancouver, BC V5Z 1M9, Canada

**THE AUTHORS REPLY:** Andrews and Cooper incorrectly imply that we have suggested an increased likelihood of lightning strikes in people using mobile telephones or MP3 players during thunderstorms, when in fact we stated the opposite and cited a reference to that effect.<sup>1</sup> In addition, we did acknowledge that tympanic-membrane perforations are common findings in patients who have been struck by lightning; nonetheless, the fact that unilateral perforations have been reported in patients using standard or mobile telephones at the time of injury suggests that having such a device in contact with the ear has some influence on the incidence.<sup>2,3</sup>

Mick et al. comment that we did not consider that the headphone wires could have conducted electricity away from the patient's head. It is certainly a possibility; an additional possibility is that they conducted the current away from his heart, thus saving his life — we can only speculate about the pattern of injuries the patient would have received had he not been carrying an iPod. Although it is true that the patient did not lose consciousness, he had significant retrograde am-

nesia after the event, which is a recognized sequel of central nervous system injury in patients who have been struck by lightning.<sup>4</sup> The additional fact that his mandible fractured in four places, at the same time dislocating both temporomandibular joints, leaves no doubt as to whether current passed through his head. We did not suggest that the otologic injuries were caused by electric shock, and we agree that blast effect was the underlying mechanism.

It is clear that the evolution of thin-collimation, multidetector computed tomography has facilitated the evaluation of the ossicular chain. However, the absence of previous reports of ossicular dislocation in patients who have been struck by lightning cannot simply be attributed to technological advances; there are numerous reports, spanning several decades, of surgical and postmortem middle-ear exploration in such patients but no previously documented case of ossicular disruption.<sup>5</sup>

A final note on jogging in thunderstorms: much of the very interesting debate that has followed the publication of this case report would perhaps be unnecessary if common sense were as ubiquitous as the iPod.

Eric J. Heffernan, M.B., B.Ch.

Peter L. Munk, M.D.

Luck J. Louis, M.D.

Vancouver General Hospital  
Vancouver, BC V5Z 1M9, Canada  
ejheffernan@eircom.net

1. Faragher RM. Injury from lightning strike while using mobile phone: statistics and physics do not suggest a link. *BMJ* 2006; 333:96.
2. Glunčić I, Roje Ž, Glunčić V, Poljak K. Ear injuries caused by lightning: report of 18 cases. *J Laryngol Otol* 2001;115:4-8.
3. Esprit S, Kothari P, Dhillon R. Injury from lightning strike while using mobile phone. *BMJ* 2006;332:1513.
4. Mahajan AL, Rajan R, Regan PJ. Lichtenberg figures: cutaneous manifestation of phone electrocution from lightning. *J Plast Reconstr Aesthet Surg* (in press).
5. Offiah C, Heran M, Graeb D. Lightning strike: a rare cause of bilateral ossicular disruption. *AJNR Am J Neuroradiol* 2007; 28:974-5.

## Retro-Orbital Hemorrhage after Thrombolysis for Acute Myocardial Infarction

**TO THE EDITOR:** Thrombolytic therapy continues to be an effective treatment for acute myocardial infarction when emergency coronary angioplasty is not available.<sup>1,2</sup> We describe a spontaneous retro-

orbital hemorrhage after thrombolysis for acute myocardial infarction in a patient with no history of surgery or trauma.

A 44-year-old, previously healthy man presented