

The Role of Economics and Weekend Meals in Impacted Fish Bone Occurrence in Central Israel

Elad Dagan MD, Arkadi Yakirevich MD, Lela Migirov MD and Michael Wolf MD

Department of Otolaryngology - Head and Neck Surgery, Sheba Medical Center, affiliated with Sackler Faculty of Medicine, Tel Aviv University, Ramat Aviv, Israel

ABSTRACT: **Background:** The fish-eating habits of Israelis who present with impacted fish bones in the aerodigestive tract are unknown. **Objectives:** To retrospectively investigate the relation between an impacted fish bone in the aerodigestive tract, the species of fish, and the place of occurrence in an Israeli population.

Methods: The current prospective observational study included all patients with aerodigestive impacted fish bones who were treated in our emergency department from 1 September 2008 to 30 September 2009. The data retrieved from their medical records included age, gender, place of event (at home or elsewhere), species of fish, and method of removing the bone.

Results: A total of 108 patients – aged 1.5–87 years (median 48 years), 52.8% female – met the study criteria. Most (87%) of the events occurred at home, and 50.9% occurred during the weekend (Friday-Saturday). The bones were from low-priced fish (e.g., carp, hake) in 62% of the cases, high-priced fish (e.g., salmon, red snapper) in 30.5%, and of unknown species in 10.2%. The proportion of cases in which the fish bone was from a high-priced fish eaten out of the home was significantly higher than the cases in which a low-priced fish was eaten at home (64.3% vs. 22.3%, $P = 0.04$). One hundred bones were removed during direct oral inspection and 8 bones were removed under general anesthesia by endoscopy.

Conclusions: Most fish bone impactions in the aerodigestive tract in central Israel involve low-priced fish and take place at home over the weekend.

IMAJ 2011; 13: 48–50

KEY WORDS: impacted fish bone, foreign body, aerodigestive tract, eating preference

direct oral inspection [6]. Plain neck X-ray is usually the next step although the sensitivity and specificity of plain films in identifying fish bones are poor [7] due to diminished visibility, location (e.g., the pyriform sinus) and film orientation [7-9]. Although a computed tomography scan has a higher sensitivity, fish bone opacity is not uniform for every type of fish and knowledge of the species of the ingested fish reportedly improves the diagnostic value of imaging [9,10].

We investigated the characteristics of patients treated for impacted fish bone as well as the fish species and place of occurrence in order to identify risk factors. To the best of our knowledge this is the first study dealing with the subject of fish species and place of occurrence.

PATIENTS AND METHODS

The study group comprised all patients who presented to the emergency department of Sheba Medical Center with impacted fish bones between 1 September 2008 and 30 September 2009. The bone was removed from the aerodigestive tract by direct oral inspection, indirect laryngoscopy, flexible endoscopy or rigid laryngoesophagoscopy. The patient's charts were retrospectively reviewed for data on age, gender, species of ingested fish, place of event (home or elsewhere), and day of the week that the event occurred.

STATISTICAL ANALYSIS

Bivariate hypotheses involving continuous variables were tested with a *t*-test for independent groups with normal distribution and Mann-Whitney test for groups with abnormal distribution. Normality of the study data was tested with a one-sample Kolmogorov-Smirnov test to indicate the appropriateness of parametric testing. The chi-square test was used to determine whether the distribution of categorical variables differed across study groups. The Fisher exact test was applied when appropriate.

RESULTS

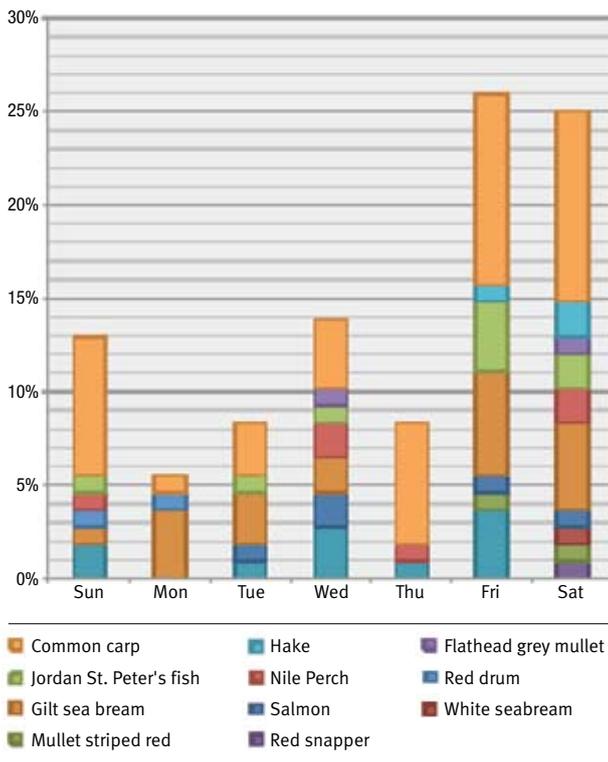
Altogether, 108 patients met the study entry criteria [Table 1]. The median age was 48 years (range 1.5– 87). Importantly, three of these patients were 4 years of age or younger. The

Fish bone impaction is a common clinical problem [1,2]. Besides being one of the most commonly encountered foreign bodies it also poses a potential risk of many complications [3-5]. The clinician should take a thorough anamnesis and exercise good clinical judgment to avoid unnecessary procedures when the bone is not found in the pharynx by

Table 1. Characteristics of the patient population and site of the meal during which the fish bone became impacted

	At home 94 patients	Not at home 14 patients	P
Age (mean, yrs)	46.2	46.4	0.92
Weekend (Fri-Sat)	52 (55.3)	3 (21.4)	0.01
Female, n (%)	49 (52.1)	8 (57.1)	0.67
Male, n (%)	45 (47.9)	6 (42.9)	
Low-priced fish (%)	60 (63.8)	4 (28.6)	0.04
High-priced fish (%)	23 (24.5)	10 (71.4)	
Unknown fish (%)	11 (11.7)	0	

Figure 1. Distribution of fish bone removed according to fish type and day of the week on presentation



majority of patients (n = 94, 87.0%) reported having eaten the fish at home, and 50.9% of the events took place over the weekend (Friday-Saturday). The species of fish eaten and day of the week are shown in Figure 1.

Table 2 lists the species of the consumed fish and their relative market price as a factor of the lowest priced fish [7,8]. Low-priced fish, defined as a price factor range of 1–2, comprised 59.3% of the impacted bones, of which the common carp (*Cyprinius carpio*) was the dominant species (41.7%). High-priced fish, defined as a price factor higher than 2, comprised 30.6% of the impacted bones, of which the gilt

Table 2. Characteristics of the type of fish bone that was impacted according to site of the meal and the relative market price of the fish species

Fish species	At home 94 patients n (%)	Not at home 14 patients n (%)	Relative market price
<i>Cyprinius carpio</i> (common carp)	43 (45.7)	2 (14.3)	1
<i>Merluccius merluccius</i> (hake)	3 (3.3)	0	1.25
<i>Mugil cephalus</i> (flathead grey mullet)	2 (2.1)	0	1.5
<i>Oreochromis aureus</i> (St. Peter's fish)	8 (8.5)	1 (7.1)	1.75
<i>Lates niloticus</i> (Nile perch)	4 (4.3)	1 (7.1)	2
<i>Sciaenops ocellatus</i> (red drum)	2 (2.1)	1 (7.1)	2.5
<i>Sparus aurata</i> (gilt sea bream)	15 (16.0)	6 (42.6)	2.75
<i>Salmoniformes</i> (salmon)	2 (2.1)	2 (14.3)	3
<i>Diplodus sargus sargus</i> (white sea bream)	1 (1.1)	0	4.5
<i>Mullus surmuletus</i> (mullet striped red)	1 (1.1)	1 (7.1)	5
<i>Lutjanus campechanus</i> (red snapper)	2 (2.1)	0	6
Unknown	11 (11.9)	0	

sea bream (*Sparus aurata*) was the dominant fish (19.4%). The gilt sea bream was also the dominant high-priced fish eaten out of home (42.5%).

The bone was removed during direct oral inspection or indirect laryngoscopy in 100 cases. Rigid endoscopy was used in 8 cases (7.4%); all of these cases occurred at the patient's home and involved the common carp in five, and the Nile perch, Jordan St. Peter's fish and flathead grey mullet in one, each. No complications of any of the removal procedures were documented. More than half (50.9%) of these events occurred over the weekend (which in Israel is Friday-Saturday).

DISCUSSION

The clinical history of an impacted fish bone is usually uncertain. The more frequent descriptions are choking or gagging while eating the fish and feeling a sharp sensation in the throat at the end of the meal, which is usually exacerbated by swallowing. The problem is even greater when the patients are pre-verbal children. Furthermore, because the bone is likely to be small, sharp and radiolucent, a conclusive diagnosis is difficult unless the bone can be clearly visualized and removed. Failure to remove an impacted fish bone can lead to devastating results, such as severe infection, esophageal perforation, mediastinitis and death [11-15]. The procedure must be performed by a physician with expertise in removing foreign bodies from the aerodigestive tract.

Common carp was the most frequently consumed fish among our patients. This finding probably stems more from its low price and its place in the local kitchen than from anything intrinsic in the fish species itself, although no data were found in the literature regarding this fact. Most of the events

leading to impaction of fish bone took place at the patient's home over the weekend, possibly because fish is a traditional course in the weekend family meal in Israel, as it is in many cultures. As expected, the proportion of events due to high-priced fish was significantly higher outside the home since common, low-priced fish are seldom served in restaurants. It should be borne in mind that most health management organization clinics are not open on the weekend, hence delay in diagnosis and treatment is predictable in a considerable number of cases.

In conclusion, in the present study we found that low-priced fish eaten at home constituted the majority of fish bone impaction cases especially during the weekend.

Corresponding author:**Dr. E. Dagan**

Dept. of Otolaryngology - Head & Neck Surgery, Sheba Medical Center, Tel Hashomer, 5262l Israel

Phone: (972-3) 530-2242

Fax: (972-3) 530-5387

email: elad.dagan@sheba.health.gov.il

References

1. O'Flynn P, Simo R. Fish bones and other foreign bodies. *Clin Otolaryngol Allied Sci* 1993; 18(3): 231-3.
2. Ngan JH, Fok PJ, Lai EC, Branicki FJ, Wong J. A prospective study on fish bone ingestion. Experience of 358 patients. *Ann Surg* 1990; 211(4): 459-62.
3. Singh B, Kantu M, Har-El G, Lucente FE. Complications associated with 327 foreign bodies of the pharynx, larynx, and esophagus. *Ann Otol Rhinol Laryngol* 1997; 106(4): 301-4.
4. Lavon O, Lurie Y, Bentur Y. Scombroid fish poisoning in Israel, 2005-2007. *IMAJ Isr Med Assoc J* 2008; 10(11): 789-92.
5. Shachor-Meyouhas Y, Guilburd JN, Kassis I. Brain abscess complicating foreign body aspiration. *IMAJ Isr Med Assoc J* 2009; 11(9): 564-5.
6. Lai AT, Chow TL, Lee DT, Kwok SP. Risk factors predicting the development of complications after foreign body ingestion. *Br J Surg* 2003; 90(12): 1531-5.
7. Ell SR, Sprigg A. The radio-opacity of fishbones - species variation. *Clin Radiol* 1991; 44(2): 104-7.
8. Bachman AL. Radiology of fish foreign bodies in the hypopharynx and cervical esophagus. *Mt Sinai J Med* 1981; 48(3): 212-20.
9. Ell SR, Sprigg A, Parker AJ. A multi-observer study examining the radiographic visibility of fishbone foreign bodies. *J R Soc Med* 1996; 89(1): 31-4.
10. Kumar M, Joseph G, Kumar S, Clayton M. Fish bone as a foreign body. *J Laryngol Otol* 2003; 117(7): 568-9.
11. Coret A, Heyman Z, Bendet E, Amitai M, Itzhak I, Kronberg J. Thyroid abscess resulting from transesophageal migration of a fish bone: ultrasound appearance. *J Clin Ultrasound* 1993; 21(2): 152-4.
12. Bendet E, Horowitz Z, Heyman Z, Faibel M, Kronenberg J. Migration of fishbone following penetration of the cervical esophagus presenting as a thyroid mass. *Auris Nasus Larynx* 1992; 19(3): 193-7.
13. Bendet E. Thyroid lobectomy for removal of a fish bone. *J Laryngol Otol* 1991; 105(2): 157.
14. Kirkham N, English R. "I have a bone stuck in my throat". *BMJ (Clin Res Ed)* 1984; 289(6442): 424-5.
15. Sharland MG, McCaughan BC. Perforation of the esophagus by a fish bone leading to cardiac tamponade. *Ann Thorac Surg* 1993; 56(4): 969-71.