Prevalence and public health importance of anisakid nematode in lizard fish collected from Sharkia Governorate, Egypt

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Abstract

Foodborne infections due to parasites have been well known since time and continue to be of great importance in many regions of the world. A total of one hundred specimens of *Saurida undosqamis* (lizard fish) were collected from fish markets at sharkia governate from October 2018 till the end of May. Samples were investigated parasitologically for anisakid nematode larvae. The results showed that the total prevalence of anisakid nematode was 59%.The sites of infection were intestinal caeca, peritoneal cavity, stomach, large intestine and liver. Anisakis spp., Phocanema spp. and Hystyrothylacium larvae were isolated.

Introduction

Marine fishes play an important economic role in providing increasing source of protein especially in the developing countries. There is no doubt that parasites that found in fishery product is a hazard to human health and reduce its value. **Roberts, R. J. (2001)**. Nematodes are considered as the most economically important helminth parasites infecting fishes in the world **(Dick and Choudhury 1995).** Anisakiasis in human can be occurred through eating of raw or undercooked fish harbouring the infective third larval stage of parasite. The risk and clinical manifestations of the infection in human was reported frequently where diarrhea can be occur few hours after ingestion of infected fish **(Ugenti et al., 2004 and Gonzalez et al., 2005).** The main nematodes known to have caused disease in humans are *Anisakis* simplex and Pseudo terranova decipiens. In humans, these nematodes can migrate from the gastrointestinal tract, becoming embedded in the gastrointestinal mucosa and causing tissue reaction and discomfort **Beldsoe, G. E., & Oria, M. P. (2001).**

Materials and methods

One hundred of lizard fish *Saurida undosquamis* were collected from October 2018 till the end of May 2019 from fish markets, Sharkia governate. Skin surface, fins, and gills of fish were examined by the naked eye and dissecting microscope for any attached parasites, lesions, or external changes **(Inoue et al. 2000).** After dissection, nematode worms as larvae were collected from the surface of visceral organs as the stomach, intestine, and muscles;

subsequently rinsed in phosphate-buffered saline (PBS); fixed in 70 % ethanol at 60 °C; and stored in the same solution. For light microscopy, fresh and fixed worms were cleared in lactophenol. Identification was based on the comparison between the morphological characteristics of larval types including the morphology of the digestive tract, the shape and the presence of the boring tooth or the lips at the anterior end, the position of the excretory pore, and the shape of the postanal tail and its terminal mucron **(Hafesteinsson and Rizvi 1987; Olson et al. 1983; Smith 1983; Køie 1993; Anderson 2000; Shih and Jeng 2002).**

Results

Table (1): Prevalence and distribution of anisakid nematodes (n = 100)

No. infected (%)	Infected With Anisakis (%)	Infected With Phocanema (%)	Infected With Hysterothylacium larvae (%)
59 (59%)	11 fishes	46 fishes	14 fishes
	Peritoneal cavity, liver surface	Peritoneal cavity, pyloric caeca, large intestine, liver surface, stomach	pyloric caeca, large intestine, stomach

Total examined	Infected	Anisakis	Phocanema	Hysterothylacium	A.+Ph.	Ph.+H.
100	59	9	34	3	2	11
P%	59%	15.25%	57.6%	5.08%	3.38%	18.64%

n= number of examined fish

Table (2): Host size and prevalence of anisakid nematodes.

Host size class (cm)	No. examined	No. infected	P (%)	Total no. of anisakid	A.	Ph.	H.L.
13-14.9	1	1	100	3	-	3	-
15-17.9	21	20	95.24	350	-	340	10
18-20.9	15	7	46.67	64	-	61	3
21-23.9	23	9	39.13	63	-	53	10
≥ 24	41	22	53.66	101	16	83	2

II-Distribution of anisakid larvae in marine fishes:

The third-stage larvae of *Anisakis* spp. were isolated from peritoneal cavity, mesenteries, liver surface of Lizardfish (*Saurida undosquamis*). The third-stage larvae of

Phocanema decipiens were isolated from body cavity, pyloric caeca, large intestine and liver surface of Lizardfish (*Saurida undosquamis*). The third-stage larvae of *Hysterothylacium aduncum* were isolated from body cavity and mesenteries of of Lizardfish (*Saurida undosquamis*).

III-Morphological description of the detected anisakid larvae:

1. *Anisakis typica (Diesing, 1860):*

The body measured 14.14-21.85 mm in length and 0.34-0.36 mm in width. The cuticle had transverse striations. Three lips were surrounding the mouth opening; two ventrolateral lips and one dorsal lip. Boring tooth was prominent and projected anterioventrally, ventral to the mouth. The excretory pore was present between the ventrolateral lips at which a single excretory duct opened. The oesophagus consisted of two parts, anterior muscular part was long and measured 1.25-2.55 mm and a posterior ventricular part was short and measured 0.49-0.79 mm. The tail was short, rounded and bears a distinct mucron at the posterior end, the anal opening was sub- terminal laying anterior the end of the body by 0.092-0.108 mm.

2. ***Phocanema (Terranova or Pseudoterranova) decipiens*** **(Krabbe, 1878):**

The body measured 5.62 - 7.71 mm long and 0.13-0.16 mm width. The cuticle was transversely striated. A characteristic boring tooth was located near the ventral margin of the dorsal lip. The excretory pore appeared as a slit-like between the two ventrolateral lips at the base. The oesophagus was divided into anterior muscular part measured 0.64-0.83 mm long and posterior ventriculus glandular part measured 0.23-0.38 mm long. Intestinal caecum measured 0.49-0.72 mm long and extending anteriorly. Tail was short, bluntly rounded and had a small mucron at its tip. Anal opening was sub- terminal laying anterior the end of the body by 0.108-0.139 mm.

3. Hysterothylacium aduncum **(Ward et Magath, 1917)**

The body was elongate, tapering anteriorly and posteriorly. The body length was 10.45-11.4 mm and maximum width was 0.131-0.185 mm at the middle of the body. Three large lips were present at the anterior end; two large ventrolateral and one dorsal, the dorsal one was somewhat shorter. The lips were somewhat wider than the body. Interlabia were present. Excretory pore situated just behind nerve ring. Ventriculus was short and it measured 0.022-0.041 mm in length. Intestinal caecum run anteriorly at nearly half or more of the muscular oesophagus and it measured 0.277-0.308 mm in length. Ventricular appendix run posteriorly and it measured 0.678-0.77 mm in length. Tail was conical and armed with numerous spines situated at different levels and appeared as cactus-tail. The anal opening was sub- terminal lying anterior to the end of the body by 0.116-0.169 mm.

Discussion

This study was carried out on one hundred of lizard fish. We revealed that the total prevalence of anisakid nematode was 59%. This result was lower than **Morsy et al. (2015)**

which was 75%. Comparatively, anisakid nematode were detected at lower incidence by **Abd al-Aal et al. (2008), Nada and Abd El-Ghany (2011) and Ahmed et al. (2010)** which was 41.86%, 43.43% and 48.76%, respectively.

In this study, anisakid larvae were found in muscles, body cavity, mesenteries, liver surface, and gonads of the infected marine fish. **Smith (1984)** suggested that the distribution of anisakid larvae are mainly governed by the conditions encountered within host tissues and are possibly related to the availability of nutrients. Although most larvae were found attached to the viscera or free in the body cavity of infected fish, their importance as a potential source of human infection cannot be excluded **(Smith and Wootten, 1975).**

Morphometric characteristics of larvae were in accordance with **Abd al-Aal et al. (2008), Nada and Abd El-Ghany (2011) and Ahmed et al. (2010)** and **Morsy et al. (2015)**

References

Beldsoe, G. E., & Oria, M. P. (2001). Potential Hazards in Cold-Smoked Fish: Parasites. *Journal of Food Science*, *66*, S1100-S1103.

Nada, M.S.M and Abd El-Ghany , A.M. (2011): Anisakid nematodes in marine fishes. Journal of American Science, 7(9):1000-1005.

Ugenti, I., De, A. C., Ferrarese, F., Rizzo, C., Manta, R., & Fabiano, G. (2004): Gastric anisakidosis: personal experience. *Chirurgia italiana*, *56*(2), 301-305.

Anderson RC (2000) Nematode parasites of vertebrates: their development and transmission. CAB, Wallingford

Dick TA, Choudhury A (1995): Phylum Nematoda. In: Woo PTK (ed) Fish diseases and disorders, volume I protozoan and metazoan infection. Cambridge University Press, Cambridge, UK, pp 415– 446.

González, S. Q., González, R. E., Arias, L. G., Gil, A. M., Vicente, J. S., & Corral, E. F. (2005): Anisakiasis gastrointestinal manifestations: description of 42 cases. *Revista clinica espanola*, *205*(7), 311-315.

Hafesteinsson H, Rizvi SS (1987) A review of the sealworm problem: biology, implications and solutions. J Food Prot 50:70–84.

Inoue K, Oshima SI, Hirata T, Kimura I (2000) Possibility of anisakid larvae infection in farmed salmon. Fisheries Sci 66:1049–1052.

Køie M (1993) :Aspects of the life-cycle and morphology of *H. aduncum* (Rudolphi, 1802) (Nematoda, Ascaridoidea, Anisakidae). Can J Zool 71:1289–1296

Mohamed, M.S.A. (2010): Role of Atherina species in transmitting some parasitic disease to man. M.V.Sc. Thesis, (zoonosis), Fac. Vet. Med., Zagazig University.

Olson AC, Lewis MD, Hauser ML (1983) Proper identification of anisakine worms. Am J Med Technol 49:111–114.

paraguassu, A.;Luque,J.and Alves,D.R.(2002): Community ecology of the metazoan parasites of red porgy, *Pagrus pagrus* (L., 1758) (Osteichthyes, Sparidae), from the coastal zone, state of Rio de Janeiro, Brazil.Maringa,24(2):461-467.

Roberts, R. J. (2001): Fish pathology 3rd edition. W. B. Sauders. U. K.
Shih HH, Jeng MS (2002) *H. aduncum* (Nematoda: Anisakidae) infecting a herbivorous fish, *Siganus fuscescens*, off the Taiwanese Coast of the Northwest Pacific. Zool Stud 41(2):208–215.
Smith JW (1983): *Anisakis simplex* (Rudolphi, 1809, det. Krabbe. 1878) (Nematoda: Ascaridoidea): morphology and morphometry of larvae from euphausiids and fish, and a review of the life-history and ecology. J Helminthol 57:205–224.
Smith, J.W. ,1984. The abundance of *Anisakis simplex* L3 in the body cavity and flesh of marine teleosts. Int. J. Parasit., 14: 491-495.
Smith, J.W. and Wootten, R. , 1975. Experimental studies on the migration of *Anisakis sp.* larvae (Nematoda: Ascaridida) into the flesh of herring, *Clupea harengus* L. Int. J. Parasit., 5: 133-136.

الملخص العربى

الاهمية الصحية للديدان الاسطوانية (الانيساكيد) ومدى انتشارها فى اسماك المكرونة المسوقة بمحافظة الشرقية، مصر

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إن العدوى الطفيلية المنقولة عن طريق الأغذية معروفة منذ القدم ولا تزال ذات أهمية كبيرة في العديد من دول العالم. تحدث الاصابة الطفيلية في الإنسان من خلال تناول الأسماك النيئة أو غير المطهية جيدًا التي تحتوى على المرحلة اليرقية الثالثة من الطفيل . لذا تم جمع ١٠٠ عينة من أسماك المكرونة (Saurida undosqamis) من أسواق محافظة الشرقية فى الفترة من أكتوبر ٢٠١٨ حتى نهاية مايو ٢٠١٨. تم فحص عينات الاسماك طفيلياً للكشف عن يرقات الديدان الاسطوانية (الأنيساكيد). أظهرت النتائج أن معدل الانتشار الكلي للديدان الاسطوانية (anisakid) كان ٥٩ ٪ وكانت مواقع الإصابة هي التجويف البريتوني والمعدة والأمعاء الدقيقة والكبد كما تم عزل يرقات هستيروثيلاسيوم، Anisakis spp. Phocanema spp من عينات الاسماك المفحوصة.