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Suppurative thyroiditis caused by *Salmonella enteritidis*

Ropne zapalenie tarczycy w przebiegu zakażenia *Salmonella enteritidis*Urszula Ambroziak¹, Janusz Pachucki¹, Tomasz Bednarczuk^{1, 4}, Ryszard Pogorzelski², Sadegh Toutounchi²,
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Abstract

Bacterial thyroiditis is a rare disease, and one of which the clinical symptoms and signs are frequently misleading. On the other hand, prompt diagnosis is crucial for successful treatment. We report the case of an 82 year-old man with diabetes mellitus type 2 and a history of steroid treatment who presented with severe odynophagia and dysphagia associated with fever, chills, sore throat and right ear pain. Based on the clinical picture, radiological studies, thyroid cytology, blood and thyroid aspirate culture, suppurative thyroiditis caused by *Salmonella enteritidis* was diagnosed. The patient was successfully treated with antibiotics and surgical drainage. (Pol J Endocrinol 2011; 62 (5): 466–470)

Key words: salmonella, acute suppurative thyroiditis, surgical drainage

Streszczenie

Ropne zapalenie tarczycy jest rzadką chorobą, której przebieg może być początkowo przyczyną błędnej diagnozy. Jednocześnie właściwa diagnoza jest niezbędna w celu wdrożenia właściwego leczenia. W pracy przedstawiono przypadek 82-letniego mężczyzny chorego na cukrzycę typu 2 i z wywiadem kortykosteroidoterapii. Pacjent zgłosił się do lekarza z powodu dysfagii i odynofagii, którym towarzyszyła gorączka, dreszcze, ból gardła i ból prawego ucha. Na podstawie obrazu klinicznego, badań radiologicznych, cytologii komórek tarczycy, posiewu krwi i aspiratu tarczycy rozpoznano ropne zapalenie tarczycy w przebiegu zakażenia *Salmonella enteritidis*. Chorego skutecznie wyleczono, stosując antybiotyki i drenaż chirurgiczny. (Endokrynol Pol 2011; 62 (5): 466–470)

Słowa kluczowe: salmonella, ropne zapalenie tarczycy, drenaż chirurgiczny

Introduction

Suppurative thyroiditis (ST) is a rare disease [1]. The rarity is a consequence of protection of the thyroid gland by several factors: fibrous encapsulation, high local iodine and hydrogen peroxide concentration, rich blood supply and efficient lymphatic drainage [2]. This makes the gland remarkably resistant to bacterial infections. ST may develop in the presence of congenital abnormalities such as pyriform sinus fistula or thyroglossal duct remnant [3, 4]. ST may also occur as a result of haematogenous and lymphatic spread as well as by direct invasion from surrounding infected tissues. Thyroid autoimmune disease, nodular goitre, thyroid cancer, advanced age or diminished immunocompetence are the main susceptibility factors for ST development [5, 6].

ST is caused most commonly by bacterial infection, although fungi, parasites or mycobacteria have also been reported [6, 7]. The commonest species among bacterias isolated from thyroid aspirates of patients

with ST are: *Staphylococcus aureus*, *Streptococcus pyogenes*, *Staphylococcus epidermidis* and *Streptococcus pneumoniae*. Gram negative species ST (*Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *E.coli*) are much less common.

The chief manifestations of ST are tenderness, severe pain localised over the affected lobe or the entire gland associated with erythema of the overlying skin. This is commonly accompanied by odynophagia and dysphagia. The pain radiates frequently to the pharynx, ear, mandible or occipital area. In the presence of bacteremia, symptoms such as fever and chills are frequently present [8].

Ultrasound (US) imaging often reveals unilobular, hypoechoic, irregular swelling of the thyroid with or without abscess formation. Thyroid scan shows absent or decreased radionuclide uptake.

The therapy of ST consists of antibiotic treatment and abscess drainage. If appropriate treatment is undertaken, the prognosis is generally very good. Complications such as: tracheal or oesophageal obstruction



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and/or perforation, mediastinitis, pericarditis or sepsis may be life-threatening if diagnosis and therapy are postponed [9].

Herein we describe a patient with *Salmonella* thyroiditis whose initial diagnosis was thyroid malignancy and whose infection was obscured by an outpatient antibiotic treatment.

Case report

An 82 year-old, overweight man was consulted by the endocrine service due to abnormal thyroid function test and a suggestion of thyroid malignancy on computerised tomography (CT) scans (Figure 1A). His past medical history was significant for type 2 diabetes mellitus, hyper-

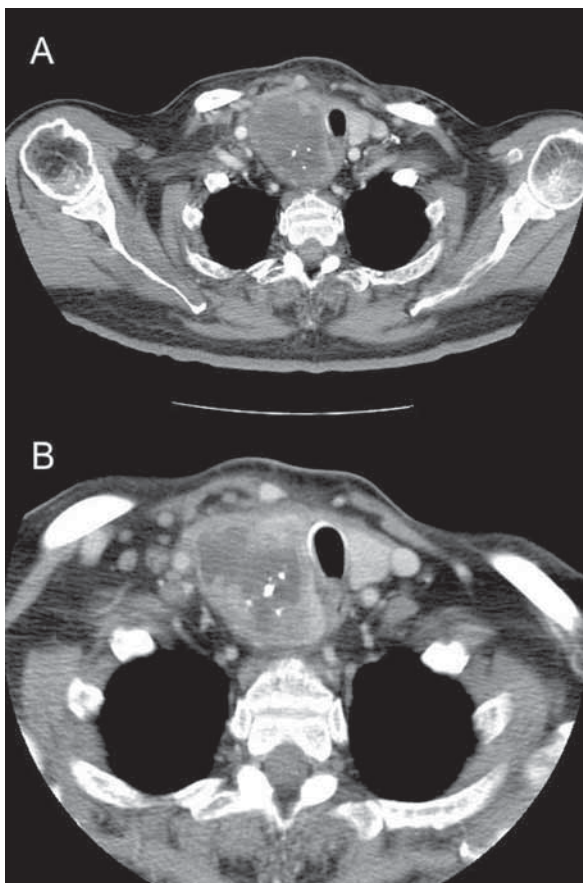


Figure 1. Neck CT on admission — neck mass localised around the right thyroid lobe (70 × 40 × 30 mm) extending to mediastinum, compressing trachea and oesophagus (A); after four weeks of antibiotic treatment — suspicion of abscess formation, no shrinkage of the right thyroid lobe compared to previous examination (B)

Rycina 1. CT szyi przy przyjęciu — masa zlokalizowana w obrębie prawego płata tarczycy (70 × 40 × 30 mm) schodząca do śródpiersia, uciskająca tchawicę i przetyk (A), po czterech tygodniach antybiotykoterapii — podejrzenie formowania się ropnia, bez cech zmniejszenia się prawego płata tarczycy w porównaniu z poprzednim badaniem (B)

tension, coronary heart disease and cardiac arrhythmias (paroxysmal atrial fibrillation, supraventricular tachycardia, non-sustained ventricular tachycardia).

Four weeks earlier, the patient had a one week episode of chills and fever up to 39°C followed by right ear pain, sore throat, odynophagia and dysphagia. He did not complain of anterior neck pain. At that time, he was put on oral amoxicillin/clavulanic acid for three days. Prior to these symptoms, he had also received three injections of potent glucocorticoid (betametasone dipropionate) into his left knee given every two weeks (probably related to left knee pain). Due to continuous ear pain, he was admitted to the Department of Otolaryngology where empirical intravenous antibiotic therapy was employed (amoxicillin/clavulanic acid plus metronidazole) for seven days. Neck and chest CT revealed neck mass localised around the right thyroid lobe (70 × 40 × 30 mm) extending to the mediastinum, compressing trachea and oesophagus without infiltrating their walls (Figure 1A). Enlargement of the right cervical and supraventricular lymph nodes was also seen. The patient was qualified for surgery and was transferred to the Thoracic Surgery Unit. An endocrine consult was ordered due to unexplained abnormalities in his thyroid function test (TSH 0.01, normal range 0.27–4.2, free T4 26.2 pmol/L, normal range 12–22).

On admission to the endocrine service, the patient was in a poor condition, asthenic and depressed. He was still suffering from marked odynophagia and dysphagia. He was unable to swallow any solid or liquid food and required gastric transnasal tube feeding.

On examination, he was afebrile with heart rate 90/min, BP 160/80 and respiratory rate 18/min. He had hoarse voice without dyspnoea at rest. On palpation, the right thyroid lobe was markedly enlarged, hard, with irregular surface. Only slight tenderness over the right thyroid lobe was noted. The overlying skin appeared unchanged. Laboratory findings are shown in Table I.

The thyroid US revealed the presence of a large right thyroid lobe tumour (39 × 42 × 70 mm) with irregular hypoechoic echostructure, normal left lobe and enlargement of right cervical lymph nodes. The working diagnosis was anaplastic thyroid carcinoma.

Due to the prior history of fever with chills and markedly elevated C reactive protein (CRP) level, after obtaining blood cultures, the patient was started on intravenous ceftriaxon. Fine needle aspiration biopsy (FNAB) of the thyroid mass showed numerous neutrophils and macrophages but no malignant cells (Figure 2A). Because of the suspicion of malignant necrotic thyroid neoplasm, the FNAB was repeated and a sample from the thyroid aspirate was also sent for bacterial culture. Second FNA cytology revealed the same result. Blood culture as well as thyroid sam-

Table I. Laboratory test results

Tabela I. Wyniki testów laboratoryjnych

Test	On admission	After 7 days of treatment	After 14 days of treatment	After 30 days of treatment	20 days after operation
CRP (< 10 mg/L)	68.5	22.3	14.9	8.2	0.6
Leucocytes (4–11 10 ³ /μl)	12.9	8.5	7.9	9.17	7.1
Neutrophils (50–66%)	72.8	58.8	55	52.4	44.9
Haemoglobin (14–18 g/dL)	11.6	10.2	9.4	10.7	12.3
Ferritin (30–400 ng/mL)	997		831		328
Albumin (3.5–5.3 g/dL)	2.0		2.5		4.2
TSH (0.27–4.2 μIU/mL)	0.023	0.366		0.846	0.337
Free T4 (12–22 pmol/L)	22	12.4		10.7	16.3
Free T3 (3.1–6.8 pmol/L)	2.5	1.8		2.6	3.9
Anti-TPO (0–34 U/mL)	81.28				
Anti-Tg (0–115 U/mL)	30.62				
TBII (0–1.75 IU/L)	1.28				
Blood culture	Positive for <i>Salmonella enteritidis</i>	Negative		Negative	Negative
Stool culture					Negative
Thyroid aspirate culture	Positive for <i>Salmonella enteritidis</i>		Positive	Negative	

Anti-TPO — anti-thyroperoxidase antibodies; anti-Tg — anti-thyroglobulin antibodies; TBII — thyrotropin binding inhibitory immunoglobulins

ple culture grew up an identical pathogen: *Salmonella enteritidis* sensitive to: ampicillin, ciprofloxacin, trimethoprim-sulphametoxazol, and ceftazidim. After four days of ceftriaxon treatment, odynophagia resolved, allowing the gastric tube to be removed. The patient was able to swallow normally and his condition improved rapidly. Blood culture taken while on antibiotic treatment for seven days yielded no bacterial growth. Flexible laryngoscopy, barium swallow examination, and oesophagogastrosocopy showed no abnormalities such as piriform sinus fistula or thyroglossal duct remnant that could predispose to ST. Follow-up serial thyroid ultrasounds did not reveal any shrinkage of the right lobe mass but was not consistent with abscess formation.

After two weeks of antibiotic treatment, allergic reaction to ceftriaxon occurred with a massive rash and features of leucocytoclastic vasculitis. The antibiotic was withdrawn, and the patient was given antihistamine drugs and a single dose of glucocorticoid. The repeated thyroid sample culture was still positive for *Salmonella*. The patient was started on intravenous ampicillin/sulbactam. Follow-up FNA cytology and culture taken two weeks later from the right lobe tumour revealed only single neutrophils and no bacterial growth (Figure 2B). Repeated neck CT showed suggested abscess formation within the tumour and no shrinkage of the right lobe

compared to the previous examination (Figure 1B). Neck US result was still negative for thyroid abscess formation.

After 38 days of antibiotic treatment, the patient had partial thyroidectomy and surgical drainage which confirmed the presence of a thyroid abscess. Surgery was performed based on the following grounds: lack of mass shrinkage observed on US and CT, suspicion of abscess formation, the presence of diabetes mellitus and uncertainty related to the possibility of thyroid malignancy as suggested by thyroid US.

Pathologic examination revealed the absence of neoplastic cells and purulent tissue granulation.

One week after the operation, the patient was discharged from hospital in a good condition and stayed asymptomatic during a control visit one month after discharge.

Abnormal thyroid function tests were considered as NTI (nonthyroidal illness) but additional destruction of thyroid tissue by inflammatory process could not be excluded. All tests normalised one month after surgery (Table I).

Discussion

Most patients with nonthyphoid *salmonellosis* have mild self-limited gastrointestinal symptoms, which are

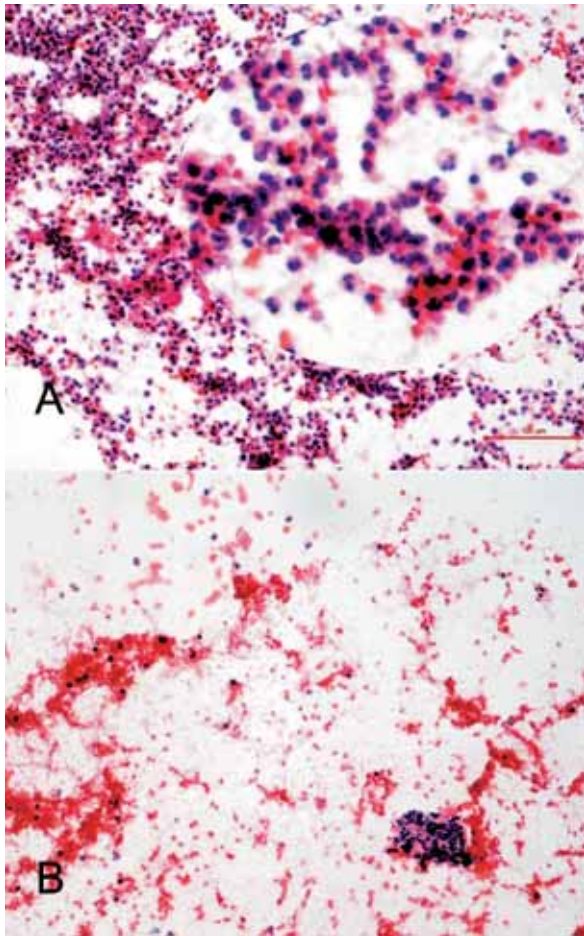


Figure 2. FNAB (right thyroid lobe) results on admission — numerous neutrophils and macrophages (A); after four weeks of antibiotic treatment — single neutrophils and macrophages (B)

Rycina 2. Biopsja cienkoigłowa prawego płata tarczycy przy przyjęciu — liczne neutrofile i makrofagi (A), po czterech tygodniach antybiotykoterapii — pojedyncze neutrofile i makrofagi (B)

frequently not treated with antibiotics. However, about 5% of them develop bacteremia and up to 16% of those with bacteremia develop septic metastases [10, 11]. The occurrence of bacteremia without associated recent signs of gastroenteritis prompts careful clinical evaluation for the presence of susceptibility factors. The commonest risk factors for nonfecal *Salmonella* isolates are corticosteroid use, advanced age, malignancy, diabetes mellitus, HIV infection, and prior use of antimicrobial or immunosuppressive drugs [10]. Extraintestinal focal *Salmonella* infections have been reported in various sites: aortitis with mycotic aneurysms, endocarditis, meningitis, pneumonia, septic arthritis, osteomyelitis, cholangitis and thyroiditis [12].

Risk factors for *Salmonella* thyroiditis overlap with risk factors for suppurative thyroiditis and other extraintestinal salmonella infections. In reported *Salmonella* ST cases, the underlying disorders have included: diabetes

mellitus, nodular goitre, follicular carcinoma, steroid use, immunosuppressive drugs use, HIV infection, liver cirrhosis, colon cancer, chronic lymphocytic leukemia, and invasive thymoma [13–20]. Similarly, our patient was at an advanced age, suffered from diabetes mellitus and used potent long-lasting glucocorticoid.

The route of infection spread can be direct, from surrounding structures and haematogenous. Among congenital anomalies leading to ST, pyriform sinus fistula is considered to be the commonest, especially in children with recurrent or left-sided ST. This, as well as other anomalies, was excluded in our patient. We believe that the ST originated from haematogenous spread of *Salmonella*.

In the described case, the patient didn't complain of anterior neck pain which is typical in this condition. The main complaints were sore throat and right ear pain.

Typical erythema of the overlying skin was also not detected in our patient.

Right thyroid lobe involvement seen in the presented subject has also been seen in 65% of described cases [13–15, 17, 19, 21–23].

The serum thyroid function tests (TSH, free T3, free T4) are usually normal in patients with ST [24]. TSH suppression, seen in our patient, might be the result of nonthyroidal illness or thyroid hormone release from damaged thyroid tissue. Similar results were also reported in three out of ten reviewed salmonella ST cases (in two others thyroid function tests were consistent with thyrotoxicosis) [18].

Although thyroid ultrasound is considered to be the most relevant imaging study in a patient with ST, it was not able to detect abscess formation in our patient. Neck CT should be used as an alternative diagnostic tool in very symptomatic ST cases or with the suspicion of abscess formation.

The recommended duration of antibacterial treatment in ST cases is 10–14 days [25]. Based on our experience, this can be insufficient in *Salmonella* ST. Although after two weeks of treatment, *Salmonella* was not found in the blood, it was still cultured from thyroid gland aspirates. Our observation indicates that treatment of at least 4–5 weeks is reasonable in cases of *Salmonella* ST to achieve extraintestinal *Salmonella* eradication.

Finally, the decision to operate after five weeks of antibiotic treatment, in spite of negative blood and thyroid cultures, was based on two notions: the possibility of anaplastic thyroid cancer (ATC) and the high rate of *Salmonella* infection relapse. The clinical signs, as well as the US features, can be, as in our case, very similar in ST and ATC. FNAB in case of fluid degeneration that occurs within ATC tissue can give a false negative result [26]. The presence of diabetes mellitus is an important fac-

tor that can predispose to infection relapse (the relapse rate reaches 17% of treated cases). In eight out of ten reviewed cases, thyroidectomy, incision and/or surgical drainage, beside antibiotics, were also carried out [18]. This suggests that surgery is an important treatment tool in patients with *Salmonella* ST.

Summary

Salmonella thyroiditis is a rare disorder. Gastrointestinal symptoms do not have to accompany the clinical picture of ST. Sore throat, odynophagia and dysphagia in the presence of fever and chills may suggest thyroiditis. *Salmonella* bacteremia should be considered as a cause of thyroiditis and prompt a careful clinical evaluation to search for predisposing factors. Herein we have reported an elderly patient, with a history of parenteral glucocorticoid treatment, with type 2 diabetes mellitus who developed *Salmonella* thyroiditis. The patient received almost five weeks of parenteral antibiotics and then underwent surgical drainage. Our observation indicates that treatment of at least four weeks duration is reasonable in a case of *Salmonella* thyroiditis. Surgery completes the treatment, especially in case of a suspicion of cancer or the presence of risk factors of infection relapse.

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