

## Can modern diagnostics help in successful treatment of cervical necrotizing fasciitis?

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Received: 16 December 2016 / Accepted: 24 January 2017 / Published online: 10 February 2017  
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To the Editor,

We have read with great interest the article “Cervical necrotizing fasciitis: descriptive, retrospective analysis of 59 cases treated at a single center” by Elander et al. [1]. The authors presented clinical analysis and management of 59 cases with cervical necrotizing fasciitis (CNF). We would like to make some comments concerning this problem, based on our experience and literature review [2–4]. CNF is a rare and potentially fatal infectious disease, which have occurred several times in our hospital (Medical University of Gdańsk). The treatment of CNF includes intravenous antibiotics, surgical debridement, and hyperbaric oxygen therapy. We would like to stress the role of modern bacteriological diagnostic methods which allow to confirm bacterial etiology in over 80% of the cases. Radiological tools (CT, MRI, and ultrasound) are useful in differentiating between locally limited cervical abscess and CNF. Such examinations are performed every day at the early phase of the disease [4]. We believe that CT is the tool of the most importance in observing the expansion of the inflammatory process in the cervix and thorax regions.

This comment refers to the article available at doi:[10.1007/s00405-016-4126-y](https://doi.org/10.1007/s00405-016-4126-y).

An author's reply to this comment is available at doi:[10.1007/s00405-017-4487-x](https://doi.org/10.1007/s00405-017-4487-x).

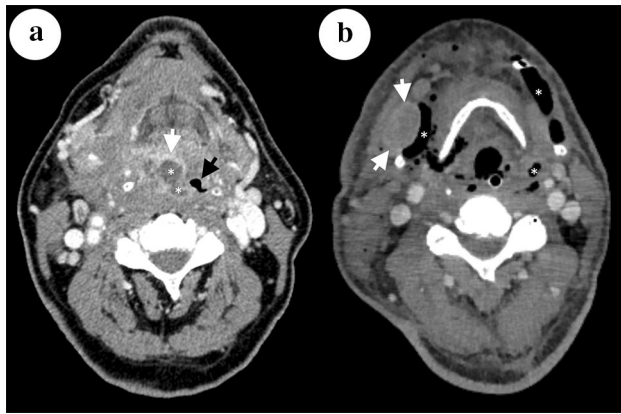
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The examination should be performed with contrast agent and should cover the neck from the basis of the skull to the sternoclavicular joints. In some cases, the chest CT is also necessary. In course of phlegmon, a non-enhanced CT can reveal thickening of soft tissues, asymmetry of neck structures, fluid collections, enlargement of lymph nodes, and the most importantly gas pockets formed by bacteria. In case of extension of the process into the subcutaneous tissue, fat stranding and irregular thickening of fascia can be seen. Contrast agent facilitates differentiation of fluid collections from inflammatory tissue thickening as involved tissue enhances. Moreover, contrast agent allows evaluation of potential vessel complications (arterial and venous occlusion, thrombosis and pseudoaneurysm formation). CT can facilitate diagnosis of CNF. Typical findings are asymmetrical thickening of superficial or/and profound fascia, fluid collections, and gas pockets. Sometimes, post-contrast enhancement of involved fascia can be observed. In the absence of typical radiological features in CT, MRI is helpful. MRI can provide early diagnosis and show the extend of inflammatory process. Involved soft tissues and fluid collections are hyperintense in T2-weighted images. In addition, contrast enhancement of soft tissues can be assessed in T1-weighted images. To assess the extension of inflammatory process into the mediastinum and pleural spaces, chest CT should be performed (Fig. 1a, b).

Ultrasound (US) examination plays minor role in diagnostics of cervical inflammatory processes. Although US can show thickening of soft tissues, fluid collections, gas pockets, increased echogenicity of the subcutaneous fatty tissue or intensified vascularization, it cannot assess profound neck structures or extension of the process into the mediastinum. Besides phlegmon and CNF, in differential diagnosis of cervical inflammatory processes, subcutaneous emphysema and cellulitis should be taken into



**Fig. 1** **a** Case of phlegmon of parapharyngeal space arising from right palatine tonsil in 74-year-old Caucasian male on axial CT image with contrast enhancement. Low attenuation fluid area (*asterisk*) with rim of enhancement (*white arrow*) and surrounding soft-tissue edema in right parapharyngeal space cause deviation of the pharynx and narrows its lumen (*black arrow*). **b** Case of phlegmon with gas formation arising from right palatine tonsil in 64-year-old Caucasian male on axial CT with contrast enhancement. Gas is visible between soft tissues (*asterisk*). Enlarged and heterogeneously enhancing lymph node in right submandibular region is present (*arrows*). In addition, subcutaneous tissue edema manifests as fat stranding

consideration. We believe that modern radiological (CT and MRI) and bacteriological diagnostics allows to introduce promptly adequate treatment assessing the extent of surgical treatment, choice of antibiotic therapy, and use of hyperbaric oxygen therapy for full therapeutic success.

#### Compliance with ethical standards

**Funding** This study was no funded.

**Conflict of interest** Author one to three declares that he has no conflict of interest.

**Research involving human participants and/or animals** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with human participants or animals performed by any of the authors.

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