

BEST PRACTICE GUIDELINES IN A NUTSHELL

Hands-on implementation of the current S3-Guideline „Odontogenic Infection“

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→ Why should you read this article?

In the field of dental surgery, in particular infection-induced inflammation, may represent a problem, which has to be taken seriously. An odontogenic infection can not only develop on the grounds of carious lesions, but also following a routine therapy at the dental surgery. In the case of an odontogenic infection the family dentist must take on the assessment of evaluating the risk of the infection spreading. In case of existing risk factors on the part of the patient or a given risk of the infection spreading it is often necessary to continue the therapy within the scope of hospitalisation. This article represents a (fictive) case and discusses the guideline therapy based on this case.

PATIENT CASE

On a Friday afternoon a 45-year old patient presented himself with a letter of referral from his family dentist for the purpose of continuing the therapy for his odontogenic infection following hospitalisation as an in-patient at the Klinik und Poliklinik für Mund-, Kiefer- und Gesichtschirurgie – Plastische Operationen – der Universitätsmedizin Mainz [Clinic an Polyclinic for oral and maxillofacial surgery – plastic surgery – at the University hospital in Mainz]. In this case the patient had undergone a root canal treatment at tooth regio 46 many years before. For quite a while, however, the patient had been suffering from recurrent pain in the right-hand lower mandible. Over the course of several days a swelling had developed on the right mandible. When the patient presented for the first time he stated with regard to his past medical history that he was in good health and was not under any medication. The swelling appeared to be a local submucuous abscess with shortened vestibulum and percussion sensitivity of the tooth regio 46. The mandible was palpable and there were no difficulties in swallowing. On the orthopantomogram an apical periodontitis in regio 46 was identified

within the scope of the radiological examination. The family dentist had initially performed an incision to relieve the submucuous abscess. At the same time he had inserted a drainage in the form of a flap to protect the N. mentalis at the punctum maximum of the swelling from inside the mouth. The patient had been informed that the tooth regio 46 was to be extracted after the disappearance of the swelling and once the submucuous process had subsided. After surgical relief pus was discharged so that no antibiotic therapy was initiated. On the following day the patient's symptoms had further subsided so that no additional therapy steps had to be implemented. Two working days after the Friday afternoon, the patient presented once again at his family dentist complaining of increasing pain and a now distinct swelling of the mandible. His mandible was now hardly palpable and a beginning lockjaw as well as pain in swallowing was identified. The family dentist immediately referred his patient to the clinic requesting a continuation of the therapy due to its risk of spreading and in view of a suspected perimandibular periapical abscess. The patient was given a prescription for an antibiotic (Amoxicillin 1000 mg, 1–1–1) by his

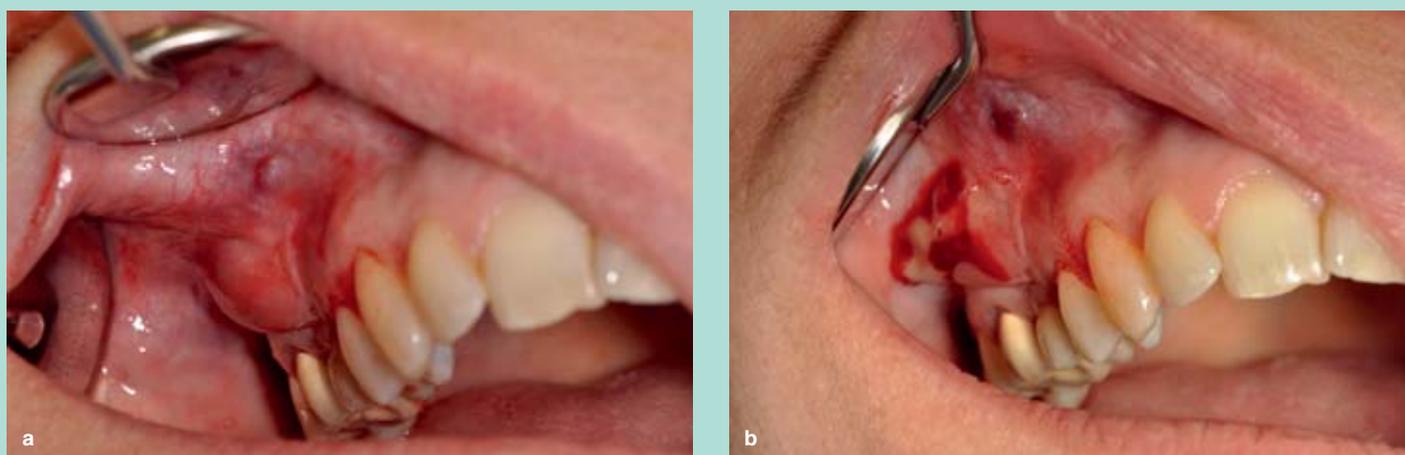


Fig. 1: Submucous abscess originating from tooth 16 in a female patient (46 years of age) with an unremarkable general past medical history: prior to incision (a); excretion of pus after vertical incision behind the Punctum maximum, in order to enable a plastic reconstruction following the tooth extraction (b)

Photos (6): Julia Heider, MKG Mainz

family dentist, however, refused to take the antibiotic.

The patient was self-employed and had some things to do at his company. He was able to do the things that had to be accomplished with the help of pain killers, so that his presentation at the clinic was delayed by some hours.

TREATMENT AS IN-PATIENT

When the patient was hospitalised, his mandible was no longer palpable and he was only able to open his mouth a couple of millimetres. The patient, as noticed, had a beginning muffled speech and a raised base of the mouth. His temperature was normal and he was in a good general state. Blood was extracted to determine the inflammation parameters (C-reactive protein, leukocytes), the electrolytes and coagulation parameters. A complete blood count without differential was performed. An intravenous antibiotic therapy was commenced immediately at a dosage of 2 g Unacid (Ampicillin/Sulbactam, 1–1–1) and the patient was prepared for an extraoral incision of the periapical abscess in intubation anaesthesia. The incision was performed extraorally by inserting 3 small drainage tubes.

The tooth 46 was extracted within the scope of surgery. On opening the peri- mandibular abscess a considerable amount of pus was discharged. Due to the extensive swelling a therapy with For-

tekortin (16 mg) and a Fortekortin scheme (8 mg on the first post-op day, 4 mg on the second post-op day) was commenced during the operation. During the extraoral incision a swab was taken for microbiological diagnostics. The C-reactive protein on the day of admission as in-patient was at 265 mg/dl and the leukocytes were at 24.7/nl.

The patient was unremarkable post-surgery in the anaesthetic recovery room. In the hospital room the patient was further monitored (monitoring of blood pressure and oxygen saturation). The nurses noticed the patient's persistent muffled speech, so that a doctor was consulted for evaluation. When the doctor on duty arrived, he determined that a further surgical intervention plus tracheotomy, if needed, was indicated. Parallel to informing the anaesthesiologist the oxygen saturation in the case of the otherwise up to that point stable patient dropped. Due to the comprehensive swelling and the now existing paroxysmal dyspnoea with further sinking oxygen saturation, an emergency tracheotomy was performed at the patient's bed.

After that the patient was stabilised by the anaesthesiologists as well as the oral and maxillofacial surgeons in the operation ward and further monitored in the intensive care unit. After 5 days the patient was transferred back to the normal ward. The tracheostomy was closed after 10 days and the patient was discharged 12

days after his blood parameters had normalised. During the scope of hospitalisation diabetes mellitus, which had not been known to date, was identified, so that during the period of the patient's hospitalisation treatment was commenced.

DISSUSSION OF CASUISTICS FROM DAILY ROUTINES

The (constructed) case stands symbolically for the clinical practice routines of surgical dentists, oral surgeons as well as oral and maxillofacial surgeons and demonstrates the importance of a holistic view of the patient taking his general past medical and drug history into consideration. The following remarks focus in particular on a possible propagation of the odontogenic infection and the patient's individual risk profile which can be concealed by the severity of the infection. With the publication of the current S3 Guidelines „Odontogenic Infections“ (AWMF-Register number: 007–006) public and above-all generally valid guidelines with scientifically founded and standardised recommendations for the treating dentist are for the very first time available [1]. The majority of odontogenic infections can be treated and controlled by the dentist without any complications in the dental practice. For this reason, hardly any data are available regarding the therapy of submucous abscesses in literature.

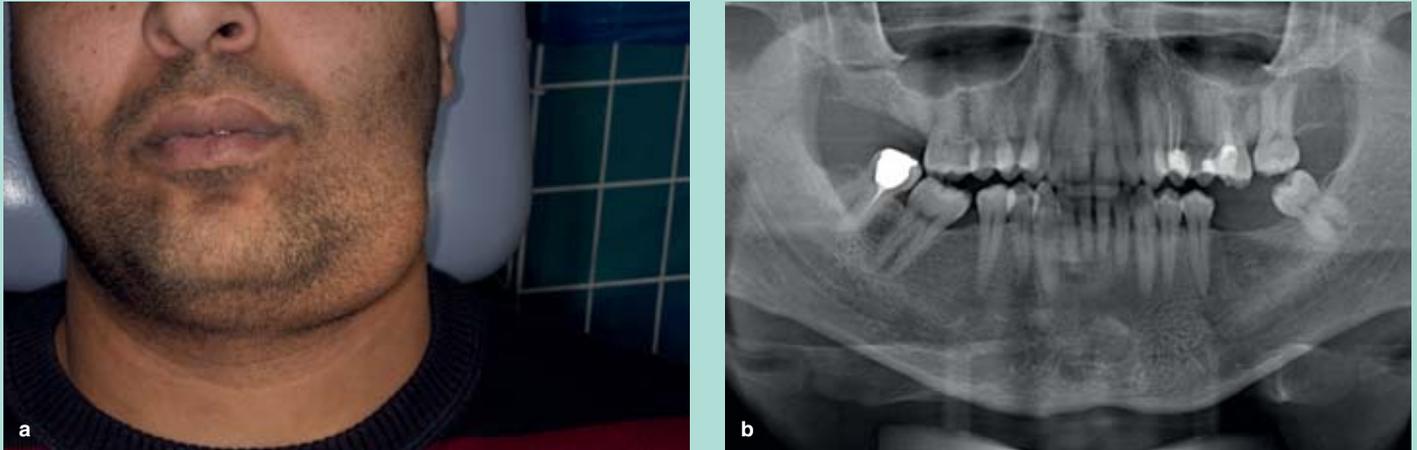


Fig. 2: Patient (57 years of age) with unremarkable general past history with an odontogenic infection with risk of propagation (perimandibular abscess) with status post tooth extraction <3 weeks ago: clinical finding of swelling perimandibular left (a); orthopantomogram at the point of hospitalisation (b)

In the case of odontogenic infections without tendency to spread the treatment of the infiltrate or local odontogenic infection shall consist of a drainage and aim at eliminating the cause of the infection (Fig. 1). In the case of insufficient anaesthesia a second intervention to remove the cause of the infection may become necessary. The patient should be informed of the second intervention which might become necessary. If this is an infiltrate and if no pus is discharged from the incision wound, an antibiotic therapy can be performed. If pus is discharged and no general medical risk factors exist, the antibiotic therapy should be waived [1]. In the case of local odontogenic infections it is possible to relieve the inflammation intraorally under local anaesthesia. It is possible, in the case of patients suffering from a blood coagulation disorder or under anticoagulant therapy, in selected cases, by means of puncturing the odontogenic infection to avoid bleeding or secondary bleeding.

Assessing the patient's risk profile as well as evaluating the risk of propagation of the odontogenic infection requires close monitoring by the dental practice team. If a risk of propagation odontogenic infection is identified (Fig. 2, 3), a surgical therapy should be implemented without undue delay; for this purpose an intervention under general anaesthesia may become necessary. The patient should be monitored post-operatively and an antibiotic

therapy should be implemented without delay. If the risk of propagation is identified or if the patient suffers from general diseases, it may be necessary to commence an antibiotic therapy prior to the surgical intervention [1]. Above all, case reports and retrospective, as well as some prospective studies are available on the hospital treatment of odontogenic infections. This fictitious case, however, reflects a procedure adopted by the family dentist and dentists/doctors at the clinic which was absolutely in accordance with the standard guidelines. Nevertheless, a fulminant development of the odontogenic infection paired with massive tendency to spread and accompanying swelling up to paroxysmal dyspnoea making tracheotomy necessary was observed. Amino-penicillin, if applicable, combined with a beta-lactamase inhibitor represents the medication of choice, if it is necessary to curb the risk of an odontogenic infection from spreading, if no contraindications are given against such a preparation. This also applies if an odontogenic infection has already been pre-treated with a penicillin or amino-penicillin without beta-lactamase inhibitor. Pathogen diagnostics can be aimed at intraoperatively in order to be able to switch to a targeted antibiotic therapy once the microbiological report is available. A surgical revision under general anaesthesia and an adaptation of the antibiotic therapy to the pathogenic spectrum

following the antibiogram might become necessary [1].

CONCEALED PROPAGATION

In particular, diabetes mellitus represents a frequent cause of a concealed propagation of an odontogenic infection [5, 13, 15]. In literature diabetes mellitus is stated as accompanying disease in 3–49 % of the patient cases with odontogenic infections as underlying condition [5, 8, 10, 19, 20]. Further risk factors are among others e.g. asthma bronchial, an immune suppression (e.g. after stem-cell or organ transplant, in the case of chronic Graft-versus-Host-Disease, under or following chemotherapy, in the case of rheumatoid arthritis, tumour patients, HIV-infection), radiation in the neck-head region, drug abuse, alcohol abuse or excessive smoking [6]. All in all it was possible to identify systemic diseases in literature research in connection with developing the S3 Guidelines among 23–100% of the patients with an odontogenic abscess and who had to undergo hospital treatment [6, 11]. The duration of hospitalisation ranged between 3 and 22 days [2, 11]. Monitoring in the Intensive Care Unit was necessary in the case of 2–100% of the patients [6, 12, 13]. A tracheotomy was performed during hospitalisation among up to 30 % of the patients on the grounds of a pronounced swelling [10]. The C-reactive protein ranged at a mean value of 107–163 mg/l on the



Fig. 3: Patient (64 years of age) with an odontogenic infection (submandibular abscess) with risk of propagation in d (submandibular abscess) towards lingual and with raised base of mouth: Patient with extraoral view (a) showing the raised base of the mouth with difficulties in swallowing (b)

day of hospitalisation [2, 11] with the leukocyte count ranging between 10–14/nl [10, 14]. The complications occurring within the scope of hospitalisation for treatment of the odontogenic infections, included sepsis, acute respiratory insufficiency, mediastinitis, fasciitis, pericarditis, pneumonia, pleural effusion, gastro-intestinal bleeding, thrombosis of the Vena jugularis, pleuritis, brain abscess, pyothorax, septic cardiomyopathy, multi-organ failure, diabetic ketoacidosis and paralysis of the vocal chord [6, 7, 9, 10, 13, 14]. In the microbiological swabs in a study from Scotland no bacteria were identified in 36 % of the patients [15]. In other studies from Germany, India and Spain up to 5 different types of bacteria were identified on the microbiological swabs [16–21]. Whether the method of taking the samples and transporting them to the microbiological laboratory has any influence on the identification of bacteria cannot be identified. In the majority of cases a mixed flora of aerobic and facultatively anaerobe (19–71 %), as well as also anaerobe bacteria were identified (5–49 %) [16–18, 20, 21]. Above all staphylococci, Viridans-streptococci, Neisseria species, Micromonas micra, Prevotella species and Bacteroides species were identified [18, 20, 22]. The bacteria tested with regard to their sensitivity in connection with antibiotics revealed a sensitivity of 67–100 % vis-à-vis Penicillin [18, 20], 75–100 % for Ampicillin [19],

83–100 % vis-à-vis Ampicillin in combination with Sulbactam [18, 20] and 57–100 % in the case of Clindamycin [19, 21]. In this context it is necessary to take into consideration that data from Germany may possibly deviate from data derived from other countries, as the development of resistance may be influenced by the prescription behaviour prevailing in the various other countries.

As soon as the clinical symptoms subside and a normalisation of the blood parameters (CRP, leukocytes) is identified after a surgical incision of the odontogenic infection, the patients can be discharged for further treatment to be continued as out-patients. In the case of in-patient therapy or patients undergoing treatment as against out-patients following an odontogenic infection, the drainage should be replaced within the scope of follow-up care at regular intervals (every 2–3 days) and the patients should present for regular check-ups until the symptoms have subsided [1].

SUMMARY

Drainage is the therapy of choice in the case of an infiltrate or local odontogenic infection (submucous abscess). In the case of an infiltrate without discharging any pus from the wound or if general risk factors are given, it is possible to perform an antibiotic therapy. If pus is discharged and if no risk factors exist, drainage is suf-

ficient to treat an odontogenic infection without risk of propagation. The odontogenic cause of the infection should be eliminated either at the same time or delayed. If the risk of propagation is identified, a surgical intervention, if applicable under general anaesthesia should be performed without undue delay. Besides monitoring the in-patient with an odontogenic infection with risk of propagation (periapical abscess), an antibiotic therapy should follow immediately. In the event of a vitally threatening propagation of the odontogenic infection, interdisciplinary cooperation at an early point in time should be aimed at. In follow-up care controls should take place and the drainage should be replaced at regular intervals.

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