A retrospective study of 256 patients with space infection

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Abstract

Aim The purpose of this study was to retrospectively evaluate a series of patients with space infection.

Patients and methods In this study 256 patients with space infection over a period of two years were treated with intravenous antibiotic and prompt incision and drainage followed by culture and sensitivity tests in some cases. Data collection included demographic, anatomic treatment and complication information.

Results The sample consisted of 256 patients with a mean age of 28 years. 7 patients were immunocompromised and 20 female patients were pregnant out of 84 female patients who were included in the study. Caries followed by implant failure were identified to be the most frequent cause for space infection. Trismus and dysphagia were present in over 70% of the cases. The vestibular masticator, perimandibular (submandibular, submental and/or sublingual) and parapharyngeal, submaxillary spaces were involved. Abscess was found in 76% of the cases. All the patients were drained under local anesthesia or conscious sedation except one patient who was drained under GA. Three deaths occurred.

Conclusion This study indicated that prompt incision and drainage along with intravenous antibiotic under local anesthesia or conscious sedation was the mainstay of treatment of severe space infection. Patients were relieved of their signs and symptoms by third day, however trismus may persist for 5–7 days.

Keywords Odontogenic space infection · Incision and Drainage · Spaces

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Introduction

Spaces as defined by SHAPHIRO are the potential spaces between the layers of fascia, normally filled with loose connective tissue and various anatomical structures like veins, arteries, glands, lymphnodes etc [1,2]. Space infections have varied etiology and occur in various spaces based on the cause of infection in its anatomical vicinity. When left untreated, space infections spread and involve not just one space but also its adjacent space and sometimes develop into life threatening infections leading to death [3]. Studying past space infections and their course of treatment will help us deal with future space infections effectively. The specific aim of this study was (a) to evaluate the effect of incision and drainage i.e. how promptly it achieves best result (b) to evaluate the effect of removing the etiology

at the same time. It was found that in some institutions, prompt incision and drainage was not done and the patients were kept on Intravenous antibiotic for long time.

Patients and methods

Study design/Sample

In this study 256 patients were retrospectively evaluated with severe odontogenic space infection. Patients were included in this study based on the following criteria: severe space infection which was determined on the basis of suggestive sign and symptoms. Informed consent was obtained. The criteria for hospital admission was: Odontogenic infection causing swelling in one or more of the deep fascial spaces of head and neck impending threat to the airway or vital structure, fever greater than

101° F, need for a general anesthesia or the need for in-patient control of concomitant systemic disease. All the medically compromised patients and pregnant females and infections due to non-odontogenic causes were also included. Previously published nomenclature and description of the deep fascial spaces were used for the purpose of this study.

Treatment methods

All the patients were subjected to the same treatment protocol (Fig. 1) [7]. The patients were prepared for surgery as soon as possible after appropriate premedical workup. Premedical workup included case history taking, physical examination, complete hematological work up, urine analysis, appropriate imaging studies like

Intra Oral Peri-Apical (IOPA) radiograph, Orthopantomogram (OPG) and medical opinion. Skin and mucosa were prepared with antiseptic solution. Incision and drainage had been performed for all anatomic spaces that were infected due to cellulitis or abscess. Specimen for culture and sensitivity tests had been harvested by either aspiration or by swap sampling of open surgical wound [4]. All spaces that were opened were copiously irrigated with saline and hydrogen peroxide and were maintained with rubber-corrugated drains. The odontogenic or nonodontogenic etiology had been removed during the same appointment. The following day the spaces were explored, any residual pus drained, wound irrigated and dressing had been done. Physical therapy had been advised. If patient had severe trismus patient had been advised spoon exercise and they were sent for physiotherapy.

Data collection

Data was analyzed retrospectively and the demographic variables like age, gender, and pre-admission variables such as the presence of immuno-compromised state (diabetes, HIV, hepatitis B, chronic renal failure) were noted. Preoperative clinical variables included causative teeth, nonodontogenic cause, sign and symptoms associated with severe infection. The anatomic variables included deep fascial spaces involved by cellulitis or abscess and number of spaces affected. The treatment variables included the anatomic space drained and presence or absence of pus at the time of drainage. Stage of infection was recorded as abscess if there had been presence of pus, and if not, stage of infection was recorded as cellulitis. All the patients were drained under local anesthesia or conscious sedation except one who had been drained under general anesthesia. The complications recorded were post drainage trismus, further spread of infection, trigeminal nerve deficit and death.

Results

256 patients (172 male, 84 female) whose age had ranged between 1½ to 75 years. 7 patients were immunocompromised, 40 patients were diabetic, 2 patients were chronic renal failure, 20 patients were pregnant. In this study, it was observed that maximum number of patient were

Fig. 1 Stepwise protocol for the management of space infection

lesser than 30 years of age and infection was mainly due to either erupting 3rd molar or carious 2nd or 1st molar (Fig. 2). Of the 256 patients 86 patients had submandibular space infection, 75 patient of vestibular space infection, 4 patient had necrotising fasciitis and in 2 patient infection spreaded to mediastinum. The most commonly space infected was vestibular followed by submandibular and buccal space infection. Some patients had infection in more than one space thus having multiple space infection creating

an over lap which is showing the pie chart (Fig. 3). Most of the patients were relieved of sign and symptoms of infection by third day. Out of 20 immuno-compromised patients, 3 patients lost their life because complications precipitated by their medical state. One patient died of septic shock. 76% cases yielded pus. One patient who was drained under GA was mentally challenged with Ludwig angina with further spread. 3 deaths occurred and all three were immuno-compromised.

Discussion

Space infection ranges from superficial to deep neck infection and they follow the path of least resistance through connective tissue and along fascial plane [5]. Space infection are often accompanied by systemic changes like fever, nausea, chills, and lymphadenopathy [6]. So there is a need for early recognition and referral. If these space infections are not recognized early, they can cause considerable morbidity and even death.

The present study was undertaken to retrospectively analyse the patient with severe space infection to know the most common etiology, to standardize a protocol for management of space infection. Space infection like submandibular, submassetric, mediastinal, lateral pharyngeal space was drained extra-orally while infection like vestibular, pterygomandibular, buccal infection were drained intra-orally.

In all the patient, same standardized protocol was followed starting from history clinical examination, lab investigation, ultrasound if necessary, I.V. antibiotic, incision and drainage extra-orally or intra-orally, copious irrigation with saline and hydrogen peroxide, drain to maintain the patency of opening. Lab investigation like complete haematology were done in each patient while specific investigation like ELISA, Hepatitis B surface Ag, serum creatinine were done in immuno compromised patient. During lab investigation, it was found that blood sugar level rises upto 200 mg% or beyond 200 mg% in severe infection and as disease was controlled, blood sugar came to normal level [8]. As most of patients with severe space infection are often dehydrated, the type of intravenous fluid to be administered had been selected depending upon the stage of infection. As per the stage of infection Dextrose Normal Saline (DNS) had been avoided in the patient, and were given Ringerlactate solution (RL) to keep the balance of serum electrolytes. All the pregnant women who were treated were in their second trimester and were treated after getting fitness for treatment from their gynecologist.

All patients had recovered well except cases with submassetric space infection where trismus was found to be a complication which had persisted for 2–3 days and in some cases lasted upto 5–7 days. Trismus patients were advised physiotherapy for mouth opening. Like every surgical procedure incision and

Fig. 2 Etiology of infections

Fig. 3 Type of infections

drainage also has some disadvantages like in cases of extra-orally drainage it leaves a scar. But prompt treatment, a course of antibiotics and follow-up has produced good results. It is a painful procedure because if carried out under local anesthesia. Sometime, the patient also complaint of numbness of lower lip which may persist for sometime. Despite the disadvantages, immediate treatment with incision and drainage may lead to septic shock and death. So timely recognition of space infection is very important.

Conclusion

Space infections occur due to spread of infection from anatomical locations in the vicinity of the space [8]. In case of immunocompromised patients and pregnant women a course of prophylactic antibiotics will help reduce the risk of spread of infection. In this study it is shown that one the most effective treatment protocols is for immediate treatment with incision and drainage for medically healthy patients. A more extensive study with a sample of varied age group would help us come to a conclusive decision for the treatment protocol for space infections.

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