Accidental intraoperative ingestion of a paralleling pin during implant placement

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INTRODUCTION

Occasionally, the instruments slip off from operators' grip during a dental procedure which might enter the pharynx, resulting in respiratory distress or gastrointestinal (GI) disturbance. Most commonly ingested instruments include endodontic files/broaches, orthodontic brackets, and implant components.1-3 Most of the radiopaque instruments are located radiographically, however, colonoscopic/bronchoscopic investigation and retrieval may be necessary if the material is radiolucent.2,3 The ingested instruments usually pass through uneventfully, but occasionally tend to get impacted at the ileo-cecal valve or recto-sigmoid junction, which might require an endoscopic or surgical intervention.4,5 We report a case of ingestion of a paralleling pin during bilateral implant placement with recommendation of few preventive techniques.

CASE REPORT

A male patient aged about 67 years with partially edentulous maxillary and mandibular arches presented to the department of oral and maxillofacial surgery for the implant-supported prosthesis. The patient was planned for implant-supported triple-unit bridge for the maxillary arch bilaterally from the first molar to the first premolar and interim denture for the mandibular arch bilaterally to the first premolar and interim denture for the mandibular arch bilaterally from the first molar to the first premolar and interim denture for the mandibular arch.

Surgical phase of implant placement bilaterally was planned in a single visit. Insertion of two implants on the right side with alloplastic bone grafting was uneventful. While checking for the parallelism in the region of 34, the paralleling pin [Figure 1] accidentally slipped off the operator's hand and was ingested involuntarily by the patient. There were no signs of aspiration such as cough, chocking, or breathlessness. The patient was informed about the condition. The procedure was aborted, and efforts were made to locate the paralleling pin in the oral cavity. The patient was taken to the radiology department, and erect abdomen posteroanterior (PA) view was taken which revealed the pin in the esophago-gastric junction [Figure 2]. The patient was re-assured about the condition, and the procedure was resumed. The patient was put on high-fiber diet and laxatives, and X-ray was repeated after a week that revealed absence of the foreign body in the GI tract (GIT) suggestive of its safe exit [Figure 3]. The patient was followed up uneventfully for a week.

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instrument front so that the tissues encountered by the ingested instrument be guarded, and the potential damage to the lining of the tissue is still possible that would result in perforation of the structures.\cite{1}

Accidental ingestion occurs mostly in children and elderly patients and those with mental disorders.\cite{5} Patients with history of surgery for head and neck cancer, could experience paresthesia, rendering the patient imperceivable to the sensory stimulus resulting in the failure of reflexes such as coughing out or any other signs of respiratory distress.\cite{6} In our case, the patient was bilaterally anesthetized, resulting in total anesthesia of tongue and floor of the mouth, which would probably have resulted in the failure perception of the foreign body in the mouth.

**Management of the accidental ingestion of the instrument into the gastrointestinal tract or airway**

When there is any accidental ingestion occurred during any dental procedure, the treatment should be stopped and the patient should be informed about the condition, and the general condition of the patient should be assessed. Airway of the patient should be assessed immediately and if any airway distress is noted, immediate measures should be taken to secure airways such as clearing any obstructions in the oral cavity, laryngeal mask airway, and endotracheal intubation.\cite{7} Prompt attempt should be made to locate the ingested foreign body by taking radiographs such as chest X-rays PA and lateral and erect abdomen PA and lateral with computed tomography scan, if required. A contrast examination generally should not be performed because of aspiration risk, and contrast coating of the foreign body and esophageal mucosa can compromise subsequent endoscopy and if the material is radiolucent, bronchoscopy is required if the foreign body enters respiratory tract. Colonoscopy is warranted if the foreign body are ingested into the gastrointestinal tract to locate it in the patient’s body. With suspected foreign body ingestion, persistent esophageal symptoms should be evaluated by endoscopy, even in the setting of a negative radiographic evaluation.\cite{8}

**Table 1: Timing of endoscopy for ingested foreign bodies**

| Emergent endoscopy                  | Urgent endoscopy                                                                 |
|-------------------------------------|----------------------------------------------------------------------------------|
| Patients with esophageal obstruction (i.e., unable to manage secretions) | Esophageal foreign objects that are not sharp pointed                             |
| Disk batteries in the esophagus     | Esophageal food impaction in patients without complete obstruction               |
| Sharp-pointed objects in the esophagus | Sharp-pointed objects in the stomach or duodenum                                  |
|                                    | Objects - 6 cm in length at or above the proximal duodenum                       |
|                                    | Magnets within endoscopic reach                                                  |
| Nonurgent endoscopy                 |                             |
| Coins in the esophagus may be observed for 12-24 h before endoscopic removal in an asymptomatic patient |                             |
| Objects in the stomach with diameter 2.5 cm |                             |
| Disk batteries and cylindrical batteries that are in the stomach of patients without signs of GI injury may be observed for as long as 48 h |                             |
| Batteries remaining in the stomach longer than 48 h should be removed |                             |

**DISCUSSION**

Whenever a foreign object enters into the system, the object will be constantly moving unless it has been impacted or locked into any particular structures such as valves and sphincters. However, the body as a reflex turns the blunt end of the
The timing for the intervention for an ingested foreign body in the host depends on the age of the patient, nature of material ingested, the physical configuration of the ingested object and location of the object in the host body, and the duration of time elapsed since ingestion of the object. Most patients who are clinically stable without symptoms of high-grade GI obstruction do not require urgent endoscopy because the object will commonly pass spontaneously [Table 1]. There are many protocols in the management of the ingested foreign bodies during any dental procedures or accidents [Table 2][9] and safety recommendation to avoid such accidents [Table 3].

Many nonendoscopic techniques may be used to retrieve the foreign body from the esophagus with the use of

**Table 2: Algorithm in decision-making for the management of foreign body ingestion**[9]

| ACCIDENTAL INGESTION/ASPIRATION OF FOREIGN BODY |
|------------------------------------------------|
| KEEP THE PATIENT IN RECLINED POSITION [REVERSE TRENDELENBERG] |
| NO AIRWAY OBSTRUCTION |
| AIRWAY OBSTRUCTION NOTICED (SYMPTOMATIC) |
| Scrutinize the entire oral cavity promptly with high suspicion of ingestion or aspiration |
| OBJECT FOUND IN ORAL CAVITY |
| • Ask the patient to cough to clear the airway |
| • Attempt dislodgement with repeated back blows |
| OBJECT DISLODGED |
| • Retrieve, identify and confirm that object is intact |
| • Reassure the patient |
| OBJECT DISLODGED |
| • Locate the ingested foreign body with Chest x-ray and abdomen radiograph |
| • Consider CT/Bronchoscopy/Endoscopy to identify radiolucent objects |
| Esophagus |
| bronchoscopy/ |
| surgery |
| Respiratory tract |
| Endoscopic removal |
| Object still remain impacted |
| Beyond esophagus in GIT |
| Immediate referral to specialist for sharp or bulky items to prevent the risk of perforation and its complication |
| OBJECT RETRIEVED |
| • Identify and confirm that object is intact |
| • Reassure the patient |
| Object not retrieved |
| Radiographic examination |
| Object present in GIT |
| Refer to Gastroenterologist to think about the need for endoscopy/surgery |
Technical recommendation to prevent ingestion of foreign bodies during dental procedures
It is always recommended to place a gauze pad at the posterior aspect of the mouth
Always use the rubber dam whenever possible if performing and restorative or endodontic procedure
When minor oral surgical procedure is being done such as fixation of intermaxillary fixation, screws, and miniplates, tether the instruments with a suture thread or a dental floss
During the placement of the implant, all the instruments that are used free hands without a handpiece should be tethered with a suture thread. When drills are being used, the fitting of the bur/drill into the handpiece should be checked outside and to be taken in to the mouth only when the fit is confirmed
Try avoiding the worn-out burs as the possibility of bur getting fractured due to excessive stress at the shank will be high that could be ingested
Always keep the pre- and post-operative counts of the instrument
Always avoid anesthetizing mandibular nerve bilaterally
Foley’s catheter balloon and nasogastric tube with outfitted magnet, however, there are chances of mucosal injury during retrieval. Whenever an ingested object is >2.5 cm in diameter, its passage through the pylorus is unlikely and has to be removed by colonoscopy. Any foreign body in the stomach for >3 weeks should be removed endoscopically.
Surgical intervention may be indicated if the patient develops symptoms of peritonitis and if the object is inaccessible to the endoscope.

Finally, if an accidental event occurs, the operator should not panic and must remain calm and composed. Reassuring and comforting the patient is the most important and if any distress symptoms occur, prompt addressing of the symptoms should be initiated and the location of the foreign body should be identified immediately.

Proper documentation of the event, size, shape, type of the ingested foreign body/instrument, and written informed consent of the patient for further intervention toward the retrieval of ingested bodies is an absolute must-in-view of the medico-legal implications.

CONCLUSION

During any dental procedure, instruments that are potentially ingested should always be used with precautions such as tethering them with the length of dental floss or suture materials and always place a gauze screen in the oropharynx region to shield the instruments from getting ingested. It is always better to anticipate the possibility of instrument ingestion and preventing it to happen. If such accident does occur, apt management protocol should be initiated and safety of the patient should be taken care of.

Ignoring the safety precautions and ending up in such mishaps could cause a serious medico-legal consequence and jeopardize the practice of the dentist.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

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