

An unusual case of small intestine perforation after the dental impression procedure

Paweł Świdorski^{1, A}, Szymon Rzepczyk^{1, B}✉, Mariusz Glapiński^{2, C}, Beata Bożek¹, Czesław Żaba^{1, D}

¹ Poznań University of Medical Sciences, Department of Forensic Medicine, Rokietnicka 10, 60-806 Poznań, Poland

² Poznań University of Medical Sciences, Department of Normal Human Anatomy, Święcickiego 6, 60-781 Poznań, Poland

^A ORCID: 0000-0002-8518-8625; ^B ORCID: 0000-0001-6330-1511; ^C ORCID: 0000-0003-1682-8921 ^D ORCID: 0000-0001-7522-4568

✉ szymon.rzepczyk@interia.eu

ABSTRACT

Accidental ingestion of a foreign body is a fairly common cause of patients presenting to hospital emergency departments. The foreign bodies that are accidentally swallowed by adults frequently include materials associated with dental procedures, most of which do not result in any complications. This paper presents the case of a 60-year-old female patient who presented to her GP because of increased abdominal pain. Conservative treatment was unsuccessful, so the patient was referred to the hospital with a suspected bowel obstruction. Diagnosis in the hospital revealed a perforation of the jejunum. The patient underwent emergency surgery and fragments of a cohesive substance were extracted from the bowel, which the patient associated with

a dental impression procedure that was carried out 7 days earlier. However, chemical analysis of the extracted plastic fragments showed that they were parts of the silicone impression material used for so-called functional impressions used in the later stage of prosthesis preparation, not the alginate material used in the 1st stage. Analysis of the patient's medical records and past medical history revealed a procedure completed 3 months earlier for another prosthesis and a condition following a hysterectomy for oncological reasons, together with numerous abdominal adhesions.

Keywords: foreign body; impression material; bowel perforation; accidental ingestion; dental prosthetics.

INTRODUCTION

Accidental ingestion of an indigestible foreign body, although a common reason for point-of-care reports, usually does not require medical intervention [1]. In about 80–90% of cases, conservative treatment is sufficient, with only about 10–20% requiring endoscopic intervention and less than 1% requiring full surgical intervention [2, 3]. Accidental swallowing is much more common in children than in adults, among whom the risk is increased by old age, psychiatric and nervous system diseases, permanent lying position, psychoactive substance abuse, or sedation [1, 2, 4]. Materials of dental origin, such as impression materials, gauze, filling compound or drills, and endodontic files, represent some of the most commonly ingested non-food foreign bodies among adults in general [1, 2, 5, 6, 7, 8]. The procedure of taking impression is a situation of increased risk of foreign body ingestion, related to the semi-fluid structure of the impression materials necessary for proper jaw mapping and the lack of strict limitations of the impression tray to allow the mass to flow into the back of the mouth [9]. Possible complications caused by foreign body entry into the gastrointestinal tract that require medical intervention include mucositis, bleeding, necrosis of the gastrointestinal wall, intestinal obstruction, abscesses, fistulas and perforations, and secondary peritonitis and sepsis [1, 4].

CASE REPORT

A 60-year-old female patient presented to her primary care physician because of persistent abdominal pain of unknown origin and vomiting. On physical examination, the abdomen was found to be bloated and palpably tender. Conservative treatment in the form of an analgesic (ketoprofen) and antiemetics (metoclopramide) and decongestants (drotaverine) was administered. After 3 days without improvement, the patient was referred to the hospital with a suspected bowel obstruction. In the internal medicine ward, a markedly elevated C-reactive protein (CRP) value (192 mg/L) was found, and on physical examination there was compression pain in the epigastrium and mid-abdomen, as well as negative peritoneal symptoms with lively peristalsis. The patient was referred for an imaging examination. Abdominal ultrasound showed fluid content with limited motility with a solid lesion coming out of the pelvis on the left side with increased echo and dimension up to 74 mm, which was the indication for computed tomography (CT), which showed air between the liver and diaphragm and dilatation of the bowel loops, clearly indicating perforation. The patient was transferred to the surgical ward and operated on urgently. A laparotomy was performed. The operation revealed multiple adhesions and interloop abscesses. The perforation was located in the jejunum at a distance of 80–90 cm from the cecum. The fragment of the bowel with perforation

was resected. Fragments of homogeneous hard plastic mass were extracted from the removed bowel fragment (Fig. 1). The patient was discharged home 20 days after the procedure.



FIGURE 1. Fragments of homogeneous hard plastic mass extracted from the jejunum

After the procedure, the patient was shown the fragments of plastic extracted from the bowel, which the patient immediately associated with the dental impression procedure to prepare a denture performed 3 days before the onset of symptoms. At the patient's request, proceedings were conducted by the public prosecutor's office and the district professional liability ombudsman against the dentist for causing grievous bodily harm. The excavated fragments of the mass were submitted for chemical analysis, which showed that they were fragments of silicone impression material. The results of the chemical analysis contradicted the patient's version, according to which the material was swallowed during the first visit to make the prosthesis, during which alginate material is used. The investigation showed that the patient had completed the full procedure for the preparation of another denture 3 months earlier. The patient's medical history also revealed a history of hysterectomy and radiotherapy for endometrial cancer 15 years earlier. A trial experiment was carried out to recreate the last visit to the dentist's office, which proved the correctness of the dentist's procedure. In addition, during one of the interviews, the patient admitted that similar symptoms had intermittently occurred since the previous denture was performed, when she may have unknowingly swallowed a material; a fact she did not report to the dentist.

On the basis of the evidence, it was concluded that the ingestion of the material must have occurred during the taking of the functional impression during the 2nd stage of the preparation of the denture, which had been completed 3 months before the incident. Numerous adhesions from previous therapeutic procedures in the abdomen and pelvis contributed to the retention of the material, which predisposed to thinning of the bowel wall and consequent perforation. The increase in symptoms shortly after the most recent dental visit was merely a coincidence.

DISCUSSION

Complications during the procedure of taking impressions in the form of swallowing a material with subsequent obstruction or perforation of the gastrointestinal tract are very rare [8, 10, 11, 12]. Usually, swallowing impression material does not require medical intervention, only conservative management [1, 4]. Impression materials are essential materials for the correct preparation of a prosthesis suitable for the patient [13]. The materials are usually non-toxic and non-irritating for tissues in the oral cavity [1, 13]. Their basic properties include the ability to permanently reproduce the anatomical relationships of the patient's maxilla and mandible, on the basis of which the prosthesis is prepared [13]. The correct procedure for preparing a dental prosthesis consists of 5 major stages [14]. In the 1st stage, impressions of the jaws are made with alginate mass which is necessary to prepare the custom trays for taking functional impressions. The functional impressions, which are the 2nd stage, are usually made with a silicone material [13]. Subsequent stages include consecutive evaluation of the maxillary occlusion, trial fitting and fitting of the denture, and final seating [14]. In this case, the patient reported that the ingestion of the material occurred during the 1st stage, so the fragment found should correspond in composition to alginate, not silicone. This inconsistency was explained by a trial experiment, which demonstrated the correctness of the impression procedure, and by the patient's testimony of the occurrence of such symptoms before, indicating that the swallowing of the mass must have occurred during the previous prosthesis preparation process and that the material had been in the intestine for an extended period of time.

Obstruction or perforation of the gastrointestinal tract resulting from swallowing impression material poses significant diagnostic problems. Firstly, the patient may be unaware of the swallowed impression material during the procedure, making it impossible to report this to the dentist and properly react to the first symptoms [6]. After taking impressions, the dentist must carefully assess the impression for any loss of material, but the site of disconnection and swallowing of a fragment may go unnoticed. In addition, a lingering material in the gastrointestinal tract may not be recognised by diagnostic imaging [7, 15]. In the case described, the material remained invisible on the CT scan, the only signs indicative of perforation being visible gas bubbles. The patient additionally showed symptoms typical of gastrointestinal perforation such as CRP level elevation and severe non-radiating abdominal pain accompanied by vomiting [3].

The usual time for passage through the gastrointestinal tract ranges 24–120 h in specific cases, but cases of foreign body expulsion without complications after 12 days have also been described [7, 15, 16]. The slowing down of the rate of intestinal passage and motility is influenced, among other things, by adhesions resulting from surgery, inflammatory diseases, or radiotherapy, which constitute a mechanical block to intestinal passage [12, 16, 17, 18, 19]. In addition, post-inflammatory strictures or as a result of radiotherapy, diverticula, and tumors predispose to foreign body entrapment in the gastrointestinal tract [18, 20].

Among the most common 'non-food' foreign body ingestions in the adult population are materials of dental origin, which include impression materials [2, 21, 22]. However, when an impression material is swallowed, it is most often spontaneously expelled without complications [19]. Still, the most commonly described complications of impression material ingestion include inflammation of the gastrointestinal mucosa and obstruction. Single cases of intestinal obstruction due to impression material ingestion requiring surgical intervention have been reported in the literature, with symptoms usually appearing up to 3 days after ingestion [11, 19].

Intestinal perforation due to the presence of a foreign body is very rare. The patient had a history of gynecological pelvic surgery, for oncological reasons, in addition to subsequent radiotherapy, which resulted in the formation of numerous adhesions, as per the obstruction surgery protocol. Such adhesions, constituting a mechanical obstruction, blocked fragments of the material in the lumen of the digestive tract, effectively preventing its expulsion. Prolonged residence of the foreign body in the small intestine induced persistent inflammation and consequent wall thinning, leading to perforation [23]. The impression material, due to anatomical considerations, can also enter the airway, most commonly the right bronchus [15, 22]. This occurs in about 10% of dental foreign bodies [5, 8, 24]. Typical symptoms then include stridor or hoarseness, cough and dyspnea, and resulting pneumonia may develop as a complication [5, 8, 25]. A case of aspiration of a piece of impression material into the airways, resembling bronchial asthma in symptoms, accidentally found during bronchoscopy, after 3 years of treatment, is described in the literature [6].

CONCLUSIONS

Ingestion of impression material is among the complications of taking dental impressions, e.g. during the procedure of preparing a denture or orthodontic appliance. It may go unnoticed despite the practitioner's due diligence. Particular care should therefore be taken with regard to the patient's risk factors and the patient should be warned of the possibility of swallowing the material. The greatest caution should be exercised when working with elderly patients, who are most likely to use dentures. After swallowing impression material, the patient should be informed of the risks and the possible symptoms indicating this complication in order to intervene quickly enough. Each time the impression procedure is performed, it is important to ensure that the trays are properly matched to the patient and that the impression material is prepared according to the manufacturer's instructions so that if the consistency of the impression material is too thin, it does not increase the risk of it flowing into the gastrointestinal tract. In addition, this paper supports the postulate by some authors that the impression

material should be radiopaque and have colors different from the mucosa in order to make it easier to distinguish from its surroundings during the extraction attempt. In daily practice, the use of protective rubber dams could be helpful in preventing accidental swallowing.

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