CASE REPORT

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# NSAIDs-induced upper gastrointestinal bleeding in elderly patients with odontogenic infection: Report of 2 cases

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## ABSTRACT

Non-steroidal anti-inflammatory drugs (NSAIDs) are widely used for pain and inflammation control in dental practice, yet their gastrointestinal risks remain frequently underestimated, particularly in older adults. This report introduces two 80-year-old men with odontogenic infection, who had serious upper gastrointestinal bleeding (UGIB) as a result of abusing NSAIDs before hospitalization. Laboratory test and upper gastrointestinal endoscopy confirmed the UGIB in patients. They received fluid resuscitation and blood transfusion. Hemostasis was achieved through epinephrine injection and cauterization. Patients was kept nir per os, and continuous use of intravenous proton pump inhibitors (PPIs) was followed. These cases highlight the need for appropriate risk assessment and preventive strategies, such as concomitant use of PPIs or use of alternative analgesics, especially in older patients.
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**Key words** : Gastrointestinal Hemorrhage; Anti-inflammatory Agents, Non-Steroidal; Infections

## Introduction

Non-steroidal anti-inflammatory drugs (NSAIDs) are frequently used to manage pain and inflammation, but their potential adverse effects are often overlooked. A cross-sectional study by Lee et al. (2011)[1] found that 45% of patients with high risk of gastrointestinal complications were prescribed with NSAIDs. Approximately 1 in 175 patients in the USA is hospitalized by gastrointestinal damage from non-selective NSAIDs usage[2]. Among these complications, upper gastrointestinal bleeding (UGIB) is one of the potentially life-threatening event, which can lead to death if not properly managed[2]. Elderly patients are more prone to UGIB and often experience severe outcomes due to frailty[1,3]. Mortality of UGIB patient in emergency admission is reported to increase by age[4].

In dental practice, NSAIDs are commonly prescribed as the first-line agents for managing acute dental pain[5]. Odontogenic infections, including periodontitis, often present with severe pain. This can increase the risk of NSAIDs overuse if the pharmacologic education is not properly done to patients. Long-term or high dose NSAIDs use can further elevate the risk of gastrointestinal complications[1]. According to the 2022 report by the Health Insurance Review and Assessment Service, dental outpatient visits in Korea have steadily risen, accounting for 47.1% of the total population, with a notable in-

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crease among older population[6]. In particular, patients aged over 80 years showed a 45.3% increase in dental visits compared with 2018[6]. It was identified that 35.2% of dental outpatients visited for treatments such as periodontitis, which may require analgesic prescriptions[6]. As the number of elderly dental outpatients continues to rise, clinicians must pay closer attention to the potential adverse effects of NSAIDs, especially in elderly patients who are more vulnerable to gastrointestinal toxicity.

This report demonstrated 2 elderly patients. At first, they were hospitalized for odontogenic infection, but severe UGIB was found, and they received a blood transfusion and cauterization with an endoscope. We found that the patients were abusing NSAIDs at high doses before hospitalization.

## Case Report

This report was approved by the Institutional Review Board of Kyungpook National University Hospital (IRB number KNUH-2025-12-002).

### Case 1

An 80-year-old man was admitted to emergency center, with complaints of swelling and pain in the left cheek. Initial laboratory tests showed a red blood cell (RBC) count of 2.37 × $10^6$ /$\mu$L and a hemoglobin (Hb) level of 7.9 g/dL. Computed tomography (CT) showed an abscess in the left submandibular region (Fig. 1A). An extraoral surgical drainage was performed, and the patient was admitted for supportive care.

On the third day of admission, follow-up laboratory tests showed decrease in RBC count (1.99 × $10^6$ /$\mu$L) and Hb level (6.6 g/dL). The blood transfusion was performed. Despite the transfusion, by the sixth day of admission, RBC counts (2.25 × $10^6$ /$\mu$L) and Hb levels (7.3 g/dL) remained low. Since no active bleeding was observed at the surgical site, an anemia work-up was made, including stool occult blood test.

On the eighth day of admission, the patient showed hematemesis. His blood pressure decreased to 88/59 mmHg. Fluid resuscitation was initiated. Laboratory tests showed Hb level of 5.6 g/dL, requiring additional transfusion. The result of stool occult blood test was positive, indicating gastrointestinal hemorrhage. A medication history found that the patient had been taking unspecified liquid painkiller daily for two weeks (approximately 2 boxes) before admission. He had also taken naproxen (Anafje Soft Cap 250 mg, Yuyu Inc., Seoul, Korea) and acetaminophen (Geworin Tab 300 mg, Samjin Pharm, Seoul, Korea).

A mucosal ulceration with adherent blood clots was observed in emergency upper gastrointestinal endoscopy. After the clot removal, oozing vessels was exposed (Fig. 1B). Hemostasis was achieved through epinephrine injection and cauterization (Fig. 1C). Continuous PPI therapy with 2 vials of esomeprazole (OMPS injection 40 mg, Chong Kun Dang Pharmaceutical Corp., Seoul, Ko-

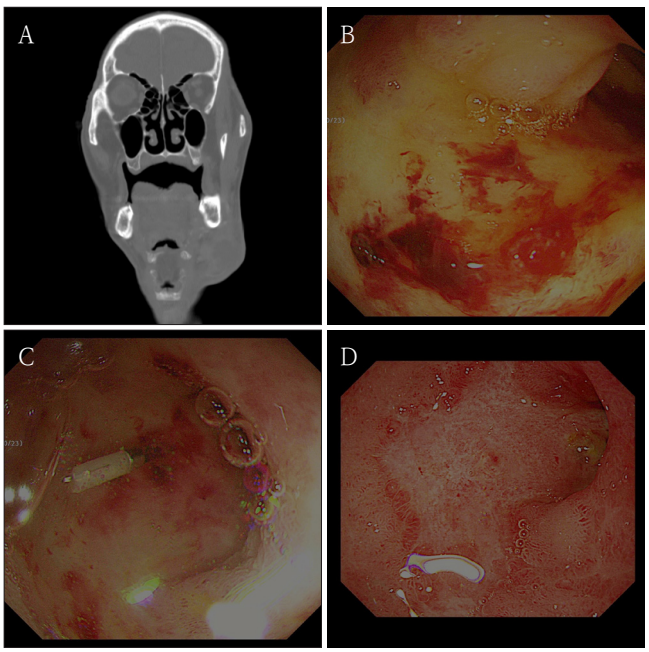


Fig. 1. A. Computed tomography shows an abscess formation on left submandibular area. B. Endoscopy shows an active bleeding on upper gastric area. C. Bleeding sites are managed by electrocauterization. D. Follow-up Endoscopy shows no signs of active bleeding.

rea) mixed in 100 mL of normal saline was initiated, and the patient was kept nil per os (NPO). On the thirteenth day of admission, as the patient's condition stabilized, he was discharged from the hospital (Fig. 1D).

### Case 2

An 80-year-old man was admitted to emergency center, with complaints of swelling extending from the right mandible to the neck. He also complained of chest pain. These symptoms developed a week after the extraction at a local dental clinic. He had medical history of hypertension.

The patient was alert but showed hypotension (99/49 mmHg) and hematemesis. Initial laboratory tests showed an RBC count of 1.64 × $10^6$ /$\mu$L, and a Hb level of 5.1 g/dL. Fluid resuscitation and blood transfusions were initiated. Neck CT showed an abscess extending from the right mandible to the deep neck space and mediastinum (Fig. 2A). Abdomen CT further indicated possible hematoma formation in stomach (Fig. 2B). A medication history found that he had taken additional painkillers with the prescribed analgesics to relieve the pain.

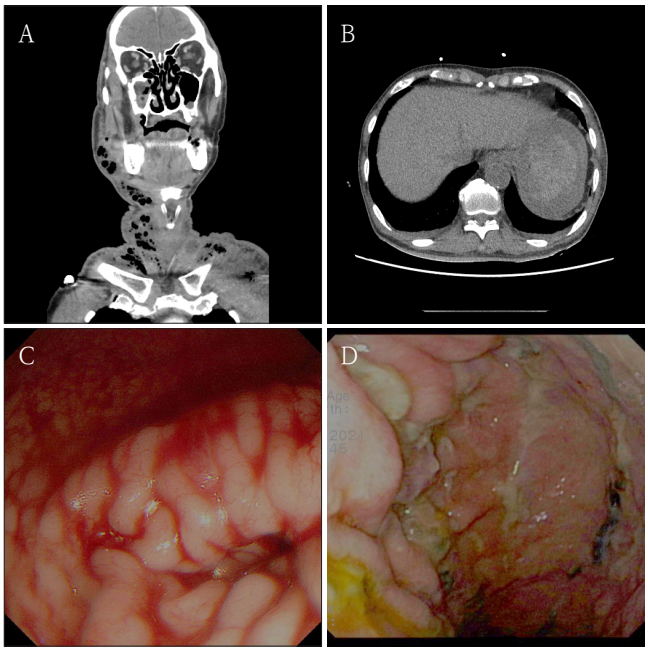


Fig. 2. A. Computed tomography shows an abscess formation on right submandibular area extending to the deep neck. B. Computed tomography shows possible signs of hematoma in stomach. C. Endoscopy shows signs of active bleeding on upper gastric area. D. Follow-up endoscopy shows improvement of ulceration.

An emergency upper gastrointestinal endoscopy was performed. However, visualization was limited by a large amount of intragastric hemorrhage and the patient's poor cooperation. Continuous PPI therapy with 2 vials of esomeprazole (OMPS injection 40 mg, Chong Kun Dang Pharmaceutical Corp., Seoul, Korea) mixed in 100 mL of normal saline was initiated, and the patient was kept NPO.

On the second day of admission, due to hypovolemic shock and unstable vital signs, embolization of the left gastric artery was performed, and the patient was subsequently transferred to the intensive care unit (ICU). An active bleeding with multiple mucosal ulcerations was found in follow-up gastrointestinal endoscopy (Fig. 2C). Blood clots were removed, and hemostasis was achieved through epinephrine injection and cauterization.

Surgical drainage for the abscess was delayed due to unstable systemic condition, including hypovolemic shock, acute kidney injury, pleural effusion and atrial fibrillation. On the fifth day of admission, the patient's condition partially improved with RBC count of 3.16 x $10^6$ /$\mu$L and hemoglobin level of 10.2 g/dL. Limited incision and drainage were performed under local anesthesia. On the eighth day of admission, follow-up gastrointestinal endoscopy showed no evidence of active bleeding and improvement of the ulcerations (Fig. 2D).

On the sixteenth day of admission, the patient was referred to the Department of Oral and Maxillofacial Surgery. Due to the delay in surgical intervention caused by his unstable condition, the infection had progressed to necrotizing fasciitis. Under general anesthesia, surgical debridement of necrotized fascia and drainage was performed successfully.

## Discussion

The primary mechanism of NSAIDs involves inhibi-

tion of cyclooxygenase-1 (COX-1) and cyclooxygenase-2 (COX-2)[7]. COX-2 plays a major role in mediating inflammation and pain[8]. However, COX-1 contributes to gastric mucosal protection, renal perfusion, and platelet function[8]. Traditional non-selective NSAIDs inhibit both COX-1 and COX-2, which can lead to gastrointestinal complications[8]. For example, patient in Case 1 had taken naproxen before admission. Naproxen, one type of non-selective NSAIDs, is considered an option for patients with cardiovascular comorbidities[9]. However, in terms of gastrointestinal safety, naproxen reported higher risk of gastrointestinal complications compared to COX-2 selective NSAIDs[10].

The risk of gastrointestinal complications related to NSAIDs has been widely discussed in previous studies[11,12,13]. A cross-sectional study conducted by Lee et al. (2011)[1] found that long-term use of NSAIDs was the most significant risk factor, followed by old age (≥65 years), the presence of comorbid diseases, and use of high-dose NSAIDs. Similarly, Korean Journal of Gastroenterology (KJG) identified several major risk factors. It included old age (≥65 years), a history of peptic ulcer, use of high-dose NSAIDs, and the concurrent use of aspirin, antiplatelet agents, anticoagulants, or corticosteroids[14]. The patients of Case 1 and 2 were both 80-years-old, and had previous history of high-dose NSAIDs usage. It might have contributed to presence of UGIB.

Old age, in particular, is closely associated with frailty, meaning increased vulnerability to stressors[15]. A 2020 study conducted in Korea found that frailty was significantly prevalent in those aged 80-84 compared to those aged 70-74[15]. Identifying frailty is important in infection control because it is linked to general complications such as sepsis, sepsis-related death, and gastrointestinal bleeding[3,16]. Frailty can be measured by frailty phenotype. The criteria for the frail phenotype include grip strength, slow walking time, weight loss, low physical activity, and exhaustion[17]. Based on the criteria, individuals are classified into frail, pre-frail, and non-frail groups[17]. In cases of oral and maxillofacial infections, frail patients more frequently require ICU management and have longer hospital stays than non-frail patients[18]. With the number of elderly dental outpatients continues to increase, the importance of systemic evaluation before prescribing NSAIDs is expected to rise[7].

When gastrointestinal complications are suspected, endoscopy and medication should be administered. Stanley and Laine (2019)[19] detailed the management process for UGIB. Endoscopy should be performed within 24 hours of the patient's arrival. Fluid resuscitation and blood transfusion should be considered based on hemodynamic assessment and laboratory tests. When active bleeding is identified during endoscopy, hemostatsis should be achieved using methods such as injection therapy or ligation[19]. In patients with a high-risk lesion, high-dose PPI therapy should be administered for 72 hours following the procedure[19]. High-dose PPI therapy is supported both before and after endoscopy, as it accelerates the hemostasis process of ulcers and reduces the risk of recurrent bleeding[20,21]. If subsequent bleeding persists, angiographic embolization may be considered[19].

To prevent incidence of NSAIDs-induced UGIB in old patients, the use of PPIs can be a method[14]. A study by Ray et al. (2007)[22] reported that concurrent use of PPIs with non-selective NSAIDs lowered the risk of peptic ulcer-related hospitalization. However, caution should be made when prescribing PPIs to patients with history of lower gastrointestinal bleeding. Use of PPIs do not reduce the risk of lower gastrointestinal bleeding, and might increase the incidence of lower gastrointestinal bleeding compared to use of NSAIDs alone[23,24].

The selection of analgesics with different mechanisms of action can be an alternative strategy to avoid gastrointestinal complication. COX-2 selective NSAIDs can prevent gastrointestinal complications associated with COX-1 inhibition. Celecoxib, a representative COX-2 selective NSAIDs, has been reported to have superior gastrointestinal safety compared with other agents. Both

Table 1. Recommendations for the use of non-steroidal anti-inflammatory drugs (NSAIDs)[14]

| | | Risk of gastrointestinal complication | |
|---|---|---|---|
| | | Low | High |
| Risk of cardiovascular disease | Low | Non-selective NSAIDs | 1. COX-2 selective NSAIDs<br>2. PPI + non-selective NSAIDs |
| | High | PPI + non-selective NSAIDs | 1. Avoid NSAIDs, if possible<br>2. PPI + COX-2 selective NSAIDs(if NSAIDs cannot be stopped) |

COX: cyclooxygenase, PPI: proton pump inhibitor

meta-analyses conducted by Castellsague et al. (2000)[12] and Tawfik et al. (2025)[25] concluded that celecoxib showed the lowest risk of gastrointestinal complications among NSAIDs. However, a previous study reported that the cardiovascular safety of COX-2 selective NSAIDs has not been clearly established and may increase the risk of renal toxicity compared to other NSAIDs[26]. In line with this, the KJG Clinical Guidelines for Drug-induced Peptic Ulcer recommend selection of NSAIDs based on patient's cardiovascular and gastrointestinal risk factor[14]. The recommendations are summarized in Table 1.

Among non-NSAID analgesics, acetaminophen can be prescribed, although its analgesic efficacy is generally lower than that of NSAIDs[27]. However, studies have reported that high doses of acetaminophen may increase the risk of gastrointestinal complications, and acute liver injury[12,28]. Tramadol can be an alternative choice. It has a lower potential for dependence and tolerance compared to other opioid agents and has demonstrated comparable efficacy to NSAIDs in relieving osteoarthritis pain[29]. However, in the management of odontogenic pain, tramadol has shown inferior analgesic efficacy compared with NSAIDs and a higher incidence of adverse effects[30].

NSAIDs are commonly used for dental pain control but can lead to serious gastrointestinal complications, including UGIB, especially in elderly patients. Clinicians should carefully evaluate patient risk factors and consider preventive strategies, such as concomitant use of PPIs or selecting alternative analgesics, to minimize adverse effects.

**Conflicts of Interest**: None

## References

1. Lee SH, Han CD, Yang IH, Ha CW. Prescription pattern of NSAIDs and the prevalence of NSAID-induced gastrointestinal risk factors of orthopaedic patients in clinical practice in Korea. J Korean Med Sci 2011; 26: 561-567.
2. Lazzaroni M, Bianchi Porro G. Gastrointestinal side-effects of traditional non-steroidal anti-inflammatory drugs and new formulations. Aliment Pharmacol Ther 2004; 20 Suppl 2: 48-58.
3. Zhang C, Huang Q, Liu X, Wang J, Wang J, Song J, et al. Frailty and risk of gastrointestinal bleeding: a prospective cohort study based on UK biobank. Front Public Health 2025; 13: 1625869.
4. Rockall TA, Logan RF, Devlin HB, Northfield TC. Incidence of and mortality from acute upper gastrointestinal haemorrhage in the United Kingdom. Steering Committee and members of the National Audit of Acute Upper Gastrointestinal Haemorrhage. BMJ 1995; 311: 222-226.
5. Green VG, Polk DE, Turturro MA, Moore PA, Carrasco-Labra A. Evidence-based clinical practice guidelines for the management of acute dental pain. Am J Emerg Med 2025; 89: 247-253.
6. 건강보험심사평가원. 치과 외래 진료현황 분석. 2023년 7월 20일. [Internet]. [cited 2025 Nov 24]. Available from: https://www.hira.or.kr/bbsDummy.do?pgmid=HIRAA020041000100&brdScnBltNo=4&brdBltNo=10925.

7. Non-steroidal anti-inflammatory drugs (NSAIDs) - mechanisms of action. In: Rovenský J, Juraj Payer P, Clague RB. Dictionary of rheumatology, Vienna: Springer; 2009. p. 146-148.
8. Park MG, Yoo JD, Lee KH. Current guidelines for non-steroidal anti-inflammatory drugs. J Korean Orthop Assoc 2020; 55: 9-28.
9. Bhala N, Emberson J, Merhi A, Abramson S, Arber N, Baron JA, et al. Vascular and upper gastrointestinal effects of non-steroidal anti-inflammatory drugs: meta-analyses of individual participant data from randomised trials. Lancet 2013; 382: 769-779.
10. Castellsague J, Riera-Guardia N, Calingaert B, Varas-Lorenzo C, Fourrier-Reglat A, Nicotra F, et al. Individual NSAIDs and upper gastrointestinal complications: a systematic review and meta-analysis of observational studies (the SOS project). Drug Saf 2012; 35: 1127-1146.
11. By the 2023 American Geriatrics Society Beers Criteria® Update Expert Panel. American Geriatrics Society 2023 updated AGS beers criteria® for potentially inappropriate medication use in older adults. J Am Geriatr Soc 2023; 71: 2052-2081.
12. García Rodríguez LA, Hernández-Díaz S. Relative risk of upper gastrointestinal complications among users of acetaminophen and nonsteroidal anti-inflammatory drugs. Epidemiology 2001; 12: 570-576.
13. Russell RI. Defining patients at risk of non-steroidal anti-inflammatory drug gastropathy. Ital J Gastroenterol Hepatol 1999; 31 Suppl 1: S14-S18.
14. Joo MK, Park CH, Kim JS, Park JM, Ahn JY, Lee BE, et al. Clinical guidelines for drug-related peptic ulcer, 2020 revised edition. Gut Liver 2020; 14: 707-726.
15. Jung H, Kim M, Lee Y, Won CW. Prevalence of physical frailty and its multidimensional risk factors in Korean community-dwelling older adults: findings from Korean frailty and aging cohort study. Int J Environ Res Public Health 2020; 17: 7883.
16. Mahalingam M, Moore JX, Donnelly JP, Safford MM, Wang HE. Frailty syndrome and risk of sepsis in the reasons for geographic and racial differences in stroke (regards) cohort. J Intensive Care Med 2019; 34: 292-300.
17. Fried LP, Tangen CM, Walston J, Newman AB, Hirsch C, Gottdiener J, et al. Frailty in older adults: evidence for a phenotype. J Gerontol A Biol Sci Med Sci 2001; 56: M146-M156.
18. Liu S, Shen H, Zhang X, Li W. Effects of frailty on patients with oral and maxillofacial space infection: a retrospective analysis. BMC Oral Health 2024; 24: 1181.
19. Stanley AJ, Laine L. Management of acute upper gastrointestinal bleeding. BMJ 2019; 364: l536.
20. Lau JY, Leung WK, Wu JC, Chan FK, Wong VW, Chiu PW, et al. Omeprazole before endoscopy in patients with gastrointestinal bleeding. N Engl J Med 2007; 356: 1631-1640.
21. Zargar SA, Javid G, Khan BA, Yattoo GN, Shah AH, Gulzar GM, et al. Pantoprazole infusion as adjuvant therapy to endoscopic treatment in patients with peptic ulcer bleeding: prospective randomized controlled trial. J Gastroenterol Hepatol 2006; 21: 716-721.
22. Ray WA, Chung CP, Stein CM, Smalley WE, Hall K, Arbogast PG, et al. Risk of peptic ulcer hospitalizations in users of Nsaids with gastroprotective cotherapy versus coxibs. Gastroenterology 2007; 133: 790-798.
23. Chan FK. NSAID-associated lower gastrointestinal bleeding: where do we stand? Clin Gastroenterol Hepatol 2012; 10: 1060-1061.
24. Lee M, Kim M, Cha JM. Risk of lower gastrointestinal bleeding in nonsteroidal anti-inflammatory drug (NSAID) and proton pump Inhibitor users compared with NSAID-only users: a common data model analysis. Gut Liver 2025; 19: 243-252.
25. Tawfik AG, Gomez-Lumbreras A, Del Fiol G, Kawamoto K, Trinkley KE, Reese T, et al. Nonsteroidal anti-inflammatory drugs and risk of gastrointestinal bleeding: a systematic review and meta-analysis. Clin Pharmacol Ther (in press).
26. Shin S. Safety of celecoxib versus traditional nonsteroidal anti-inflammatory drugs in older patients with arthritis. J Pain Res 2018; 11: 3211-3219.
27. Bailey E, Worthington HV, van Wijk A, Yates JM, Coulthard P, Afzal Z. Ibuprofen and/or paracetamol (acetaminophen)

for pain relief after surgical removal of lower wisdom teeth. Cochrane Database Syst Rev 2013; 2013: CD004624.
28. Lee WM. Drug-induced acute liver failure. Clin Liver Dis 2013; 17: 575-586.
29. Smith SR, Deshpande BR, Collins JE, Katz JN, Losina E. Comparative pain reduction of oral non-steroidal anti-inflammatory drugs and opioids for knee osteoarthritis: systematic analytic review. Osteoarthritis Cartilage 2016; 24: 962-972.
30. Isiordia-Espinoza MA, de Jesús Pozos-Guillén A, Aragon-Martinez OH. Analgesic efficacy and safety of single-dose tramadol and non-steroidal anti-inflammatory drugs in operations on the third molars: a systematic review and meta-analysis. Br J Oral Maxillofac Surg 2014; 52: 775-783.