REVIEW

9180  Assisting individuals with diabetes in the COVID-19 pandemic period: Examining the role of religious factors and faith communities
Eseadi C, Ossai OV, Onyishi CN, Ilechukwu LC

9192  Role of octreotide in small bowel bleeding
Khedr A, Mahmoud EE, Attallah N, Mir M, Boike S, Rauf I, Jama AB, Mushtaq H, Surani S, Khan SA

MINIREVIEWS

9207  Internet of things-based health monitoring system for early detection of cardiovascular events during COVID-19 pandemic
Dami S

9219  Convergence mechanism of mindfulness intervention in treating attention deficit hyperactivity disorder: Clues from current evidence
Xu XP, Wang W, Wan S, Xiao CF

9228  Clinical presentation, management, screening and surveillance for colorectal cancer during the COVID-19 pandemic
Akbulut S, Hargura AS, Garzali IU, Aloun A, Colak C

9241  Early diagnostic value of liver stiffness measurement in hepatic sinusoidal obstruction syndrome induced by hematopoietic stem cell transplantation
Tan YW, Shi YC

ORIGINAL ARTICLE

Case Control Study

9254  Local inflammatory response to gastroesophageal reflux: Association of gene expression of inflammatory cytokines with esophageal multichannel intraluminal impedance-pH data
Morozov S, Sentsova T

Retrospective Study

9264  Evaluation of high-risk factors and the diagnostic value of alpha-fetoprotein in the stratification of primary liver cancer

9276  One-half layer pancreaticojejunostomy with the rear wall of the pancreas reinforced: A valuable anastomosis technique
Wei JP, Tai S, Su ZL
Contents

Thrice Monthly Volume 10 Number 26 September 16, 2022

Development and validation of an epithelial–mesenchymal transition-related gene signature for predicting prognosis

Observational Study

Incidence and risk factor analysis for swelling after apical microsurgery

CASE REPORT

Acute carotid stent thrombosis: A case report and literature review
Zhang JB, Fan XQ, Chen J, Liu P, Ye ZD

Congenital ovarian anomaly manifesting as extra tissue connection between the two ovaries: A case report

Cefoperazone-sulbactam and ornidazole for Gardnerella vaginalis bloodstream infection after cesarean section: A case report

Early-onset ophthalmoplegia, cervical dyskinesia, and lower extremity weakness due to partial deletion of chromosome 16: A case report
Xu M, Jiang J, He Y, Gu WY, Jin B

Posterior mediastinal extralobar pulmonary sequestration misdiagnosed as a neurogenic tumor: A case report
Jin HJ, Yu Y, He W, Han Y

Unexpected difficult airway due to severe upper tracheal distortion: A case report

Special epithelioid trophoblastic tumor: A case report
Wang YN, Dong Y, Wang L, Chen YH, Hu HY, Guo J, Sun L

Intrahepatic multicystic biliary hamartoma: A case report
Wang CY, Shi FY, Huang WF, Tang Y, Li T, He GL

ST-segment elevation myocardial infarction in Kawasaki disease: A case report and review of literature
Lee J, Seo J, Shin YH, Jang AY, Sah SY

Bilateral hypocalcaemic cataracts due to idiopathic parathyroid insufficiency: A case report
Li Y

Single organ hepatic artery vasculitis as an unusual cause of epigastric pain: A case report
Kaviani R, Farrell J, Dehghan N, Moosavi S

Congenital lipoid adrenal hyperplasia with Graves' disease: A case report
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>9398</td>
<td>Cytokine release syndrome complicated with rhabdomyolysis after chimeric antigen receptor T-cell therapy: A case report</td>
<td>Zhang L, Chen W, Wang XM, Zhang SQ</td>
</tr>
<tr>
<td>9411</td>
<td>Uncontrolled high blood pressure under total intravenous anesthesia with propofol and remifentanil: A case report</td>
<td>Jang MJ, Kim JH, Jeong HJ</td>
</tr>
<tr>
<td>9434</td>
<td>Complete recovery from segmental zoster paresis confirmed by magnetic resonance imaging: A case report</td>
<td>Park J, Lee W, Lim Y</td>
</tr>
<tr>
<td>9440</td>
<td>Imaging findings of immunoglobin G4-related hypophysitis: A case report</td>
<td>Lv K, Cao X, Geng DY, Zhang J</td>
</tr>
<tr>
<td>9447</td>
<td>Systemic lupus erythematosus presenting with progressive massive ascites and CA-125 elevation indicating Tjalma syndrome? A case report</td>
<td>Wang JD, Yang YF, Zhang XF, Huang J</td>
</tr>
<tr>
<td>9454</td>
<td>Locally advanced cervical rhabdomyosarcoma in adults: A case report</td>
<td>Xu LJ, Cai J, Huang BX, Dong WH</td>
</tr>
<tr>
<td>9462</td>
<td>Rapid progressive vaccine-induced immune thrombotic thrombocytopenia with cerebral venous thrombosis after ChAdOx1 nCoV-19 (AZD1222) vaccination: A case report</td>
<td>Jiang SK, Chen WL, Chien C, Pan CS, Tsai ST</td>
</tr>
<tr>
<td>9470</td>
<td>Burkitt-like lymphoma with 11q aberration confirmed by needle biopsy of the liver: A case report</td>
<td>Yang HJ, Wang ZM</td>
</tr>
<tr>
<td>9478</td>
<td>Common carotid artery thrombosis and malignant middle cerebral artery infarction following ovarian hyperstimulation syndrome: A case report</td>
<td>Xu YT, Yin QQ, Guo ZR</td>
</tr>
<tr>
<td>9493</td>
<td>Follicular carcinoma of the thyroid with a single metastatic lesion in the lumbar spine: A case report</td>
<td>Chen YK, Chen YC, Lin WX, Zheng JH, Liu YY, Zou J, Cai JH, Ji ZQ, Chen LZ, Li ZY, Chen YX</td>
</tr>
<tr>
<td>Page</td>
<td>Title</td>
<td>Authors</td>
</tr>
<tr>
<td>------</td>
<td>----------------------------------------------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>9510</td>
<td>Intravitreous injection of conbercept for bullous retinal detachment: A case report</td>
<td>Xiang XL, Cao YH, Jiang TW, Huang ZR</td>
</tr>
<tr>
<td>9518</td>
<td>Supratentorial hemangioblastoma at the anterior skull base: A case report</td>
<td>Xu ST, Cao X, Yin XY, Zhang JY, Nan J, Zhang J</td>
</tr>
<tr>
<td>9524</td>
<td>META-ANALYSIS Certain sulfonylurea drugs increase serum free fatty acid in diabetic patients: A systematic review and meta-analysis</td>
<td>Yu M, Feng XY, Yao S, Wang C, Yang P</td>
</tr>
<tr>
<td>9536</td>
<td>LETTER TO THE EDITOR Glucose substrate in the hydrogen breath test for gut microbiota determination: A recommended noninvasive test</td>
<td>Xie QQ, Wang JF, Zhang YF, Xu DH, Zhou B, Li TH, Li ZP</td>
</tr>
<tr>
<td>9539</td>
<td>A rare cause of acute abdomen after a Good Friday</td>
<td>Pante L, Brito LG, Franciscatto M, Brambilla E, Soldera J</td>
</tr>
<tr>
<td>9542</td>
<td>Obesity is associated with colitis in women but not necessarily causal relationship</td>
<td>Shen W, He LP, Zhou LL</td>
</tr>
<tr>
<td>9545</td>
<td>Risk stratification of primary liver cancer</td>
<td>Tan YW</td>
</tr>
</tbody>
</table>
ABOUT COVER
Editorial Board Member of World Journal of Clinical Cases, Youngmin Oh, MD, PhD, Associate Professor, Neurosurgeon, Department of Neurosurgery, Jeonbuk National University Medical School/Hospital, Jeonju 54907, Jeollabukdo, South Korea. timoh@jbnu.ac.kr

AIMS AND SCOPE
The primary aim of World Journal of Clinical Cases (WJCC, World J Clin Cases) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

WJCC mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

INDEXING/ABSTRACTING
The WJCC is now abstracted and indexed in Science Citation Index Expanded (SCIE, also known as SciSearch®), Journal Citation Reports/Science Edition, Current Contents®/Clinical Medicine, PubMed, PubMed Central, Scopus, Reference Citation Analysis, China National Knowledge Infrastructure, China Science and Technology Journal Database, and Superstar Journals Database. The 2022 Edition of Journal Citation Reports® cites the 2021 impact factor (IF) for WJCC as 1.534; IF without journal self cites: 1.491; 5-year IF: 1.599; Journal Citation Indicator: 0.28; Ranking: 135 among 172 journals in medicine, general and internal; and Quartile category: Q4. The WJCC’s CiteScore for 2021 is 1.2 and Scopus CiteScore rank 2021: General Medicine is 443/826.

RESPONSIBLE EDITORS FOR THIS ISSUE
Production Editor: Hua-Ge Yu; Production Department Director: Xu Guo; Editorial Office Director: Jin-Lei Wang.

NAME OF JOURNAL
World Journal of Clinical Cases

ISSN
ISSN 2307-8960 (online)

LAUNCH DATE
April 16, 2013

FREQUENCY
Thrice Monthly

EDITORS-IN-CHIEF
Bao-Gan Peng, Jerzy Tadeusz Chudek, George Kontogeorgos, Maurizio Serati, Ja Hyeon Ku

EDITORIAL BOARD MEMBERS
https://www.wjgnet.com/2307-8960/editorialboard.htm

PUBLICATION DATE
September 16, 2022

COPYRIGHT
© 2022 Baishideng Publishing Group Inc

INSTRUCTIONS TO AUTHORS
https://www.wjgnet.com/bpg/gerinfo/204

GUIDELINES FOR ETHICS DOCUMENTS
https://www.wjgnet.com/bpg/gerinfo/287

GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH
https://www.wjgnet.com/bpg/gerinfo/240

PUBLICATION ETHICS
https://www.wjgnet.com/bpg/gerinfo/288

PUBLICATION MISCONDUCT
https://www.wjgnet.com/bpg/gerinfo/208

ARTICLE PROCESSING CHARGE
https://www.wjgnet.com/bpg/gerinfo/242

STEPS FOR SUBMITTING MANUSCRIPTS
https://www.wjgnet.com/bpg/gerinfo/239

ONLINE SUBMISSION
https://www.f6publishing.com
Uncontrolled high blood pressure under total intravenous anesthesia with propofol and remifentanil: A case report

Min Jung Jang, Jee Hee Kim, Hae Jeong Jeong

BACKGROUND

Although propofol generally reduces blood pressure, rarely, it causes hypertension. However, the mechanism by which propofol increases blood pressure has not been established, and so far, there are only a few reported cases.

CASE SUMMARY

A 46-year-old woman, diagnosed with thyroid cancer, was administered general anesthesia with propofol and remifentanil for a thyroid lobectomy. An increase in the concentrations of intravenous anesthetics further increased her blood pressure. The blood pressure remained stable when anesthesia was maintained with sevoflurane and remifentanil after the interruption of propofol administration.

CONCLUSION

We concluded that propofol administration was the cause of increased blood pressure.

Key Words: Anesthesia; Intravenous; Hypertension; Propofol; Remifentanil; Tachycardia; Case report

©The Author(s) 2022. Published by Baishideng Publishing Group Inc. All rights reserved.
Core Tip: Although propofol generally reduces blood pressure, it has been known to rarely cause hypertension. However, studies on this mechanism and related case reports are rare. We report a case of uncontrolled hypertension in a 46-year-old woman with no medical history who was administered total intravenous anesthesia with propofol and remifentanil. In our study, other factors that could cause an increase in blood pressure were excluded, and we concluded that propofol was the cause of hypertension. This is a rare, but useful, case for the anesthetic management of propofol-induced hypertension.

Citation: Jang MJ, Kim JH, Jeong HJ. Uncontrolled high blood pressure under total intravenous anesthesia with propofol and remifentanil: A case report. World J Clin Cases 2022; 10(26): 9411-9416
URL: https://www.wjgnet.com/2307-8960/full/v10/i26/9411.htm
DOI: https://dx.doi.org/10.12998/wjcc.v10.i26.9411

INTRODUCTION
Propofol is known to decrease blood pressure (BP) by inhibiting the sympathetic nerve activity and decreasing the systemic vascular resistance (SVR)\[1\]. Propofol rarely increases BP; however, its mechanism of action has not been established yet. In a patient without any underlying disease, the BP increased after starting total intravenous anesthesia (TIVA) with propofol and remifentanil. An increase in the concentrations of intravenous (IV) anesthetics further increased the BP, which remained high despite the administration of an antihypertensive drug.

CASE PRESENTATION
Chief complaints
A 46-year-old woman (height, 158 cm; weight, 58 kg) was diagnosed with thyroid cancer and admitted for left thyroid lobectomy.

History of present illness
The patient visited our clinic after the diagnosis of thyroid cancer at a health checkup. She had not complained of any symptoms related to thyroid disease and her thyroid hormone levels were within the normal range.

History of past illness
The patient had no underlying disease, past medical history, or history of medication use, including health supplements.

Personal and family history
The patient had no family history of thyroid cancer or essential hypertension.

Physical examination
Physical examination revealed that the patient’s general health condition was good. There were no apparent abnormalities. She had regular heartbeats, clear lung sounds, and no thyroid enlargement.

Laboratory examinations
The preoperative laboratory results, including thyroid function tests and electrolytes, were normal.

Imaging examinations
Electrocardiography showed normal sinus rhythm. There was no active lung lesion on chest radiography.

Intraoperative events
A 46-year-old woman with no medical or family history was diagnosed with thyroid cancer and admitted for left thyroid lobectomy. After routine preoperative examinations and anesthetic evaluations, there were no problems with her physical, laboratory, and radiological examinations. The patient had not complained of any anxiety or stress before the surgery, and the mean preoperative BP at the ward was 19.3/10.5 (15.2-22.4/9.6-10.9) kPa. No premedication was needed because the patient was comfortable. The initial BP and heart rate (HR) after entering the operating room were 18.8/11.3 kPa and 52 beats/min, respectively.
Anesthesia induction was initiated with propofol and remifentanil at target concentrations of 6 μg/mL and 3 ng/mL, respectively, using a target-controlled infusion pump. After confirming the loss of consciousness and the availability of manual bagging, 6 mg of vecuronium was administered intravenously. As the BP increased from 18.8/8.8 kPa to 22.0/10.7 kPa, the concentrations of propofol and remifentanil were increased to 7.5 μg/mL and 4.5 ng/mL, respectively. After confirming the decrease of the bispectral index (BIS) to 35 and disappearance of all twitches from the train of four stimulations, intubation was performed using a video laryngoscope. Immediately after induction, the HR decreased to 41 beats/min and atropine (0.5 mg) was administered intravenously, followed by glycopyrrolate (0.2 mg). No further events were observed during induction, and the concentrations of propofol and remifentanil were decreased to 3 μg/mL and 1 ng/mL, respectively, to prevent a drop in BP and HR before surgery.

Immediately before surgery, the concentrations of IV anesthetics were increased to 5 μg/mL of propofol and 3 ng/mL of remifentanil; however, BP remained high at 22.7-24.0/13.3-14.7 kPa. Accordingly, the concentrations of propofol and remifentanil were gradually increased from 5 to 7 μg/mL and from 4 to 5 ng/mL, respectively. At this time, the HR was stable at 60-70 beats/min but systolic BP remained above 22.7 kPa. When the concentrations of propofol and remifentanil were increased to 9 μg/mL and 6 ng/mL, respectively, the BP suddenly increased to 26.7-28.0/13.3-14.7 kPa while the BIS decreased from 24 to 8. Although labetalol (10 mg) was administered twice at 5-minute intervals, only a slight decrease in BP was observed.

The surgery was suspended owing to unexplained hypertension. Following the administration of sevoflurane 5 vol%, a slight decrease in systolic BP from 26.7 kPa to 23.9 kPa was observed. The BP returned to the normal range after suspension of propofol administration and maintenance of anesthesia with sevoflurane 3 vol% and remifentanil 3 ng/mL. Surgery was resumed after catheter insertion into the left radial artery to initiate invasive BP monitoring. BP remained stable at 13.3-16.0/8.0-10.7 kPa until the end of surgery. The total amount of 2% propofol administered was 900 mg (45 mL). The patient was discharged without any adverse events.

**FINAL DIAGNOSIS**

The final diagnosis in this case was thyroid cancer; this was the same as the preoperative diagnosis.

**TREATMENT**

The patient underwent a left thyroid lobectomy. There was no additional treatment except for routine postoperative care.

**OUTCOME AND FOLLOW-UP**

The cancer was completely removed and the patient was discharged without any complications.

**DISCUSSION**

Propofol is widely used for general anesthesia and monitored anesthesia care during diagnostic or therapeutic procedures because of its rapid onset, fast recovery time, and reduced severity of side effects. Propofol is known to decrease the BP by inhibiting the sympathetic nerve activity and decreasing the SVR[1]. Although it is widely known that propofol generally reduces BP, the mechanism for increase in BP has not been established, and related case reports are rare.

According to a retrospective cohort study investigating the adverse events and risk factors in 2937 cases of moderate to deep sedation with propofol and remifentanil, severe hypotension (mean BP < 5.3 kPa for more than 5 min) was reported in 8.8% of cases (95% confidence interval, 7.73-9.77), while severe hypertension (BP > 29.3/14.7 kPa for more than 5 min) was reported in 0.2% of cases (95% confidence interval, 0.04-0.37)[2].

In a patient who was treated for narcolepsy with modafinil, inhalation anesthetics had to be used because anesthesia could not be achieved (BIS was 72) after induction with 6 mg/kg of propofol[3]. Bache et al[4] reported insufficient anesthetic effects of propofol and remifentanil for general anesthesia in three cases over 5 years and suspected the possibility of acute tolerance to remifentanil. In this case, the patient had no medical or drug history and the BIS decreased to 35 after the administration of IV anesthetics; therefore, resistance to propofol and acute tolerance to remifentanil can be excluded.
Norie et al.[5] reported a case in which 100 μg of fentanyl and 65 mg of propofol were administered to induce general anesthesia in a 75-year-old man with no underlying medical conditions, and an additional 100 μg of fentanyl and 70 mg of propofol were administered following an increase in BP and HR; however, BP and HR remained high, suggesting that the administration of a small amount of propofol during anesthetic induction to prevent hypotension can cause hypertension and tachycardia. The patient did not experience hypertension or tachycardia during the surgery performed a week later when propofol was replaced with thiopental for anesthetic induction[5].

In an in vitro study in which the direct effects of various concentrations of propofol at different sites in isolated arteries of dogs were measured, propofol caused vasoconstriction at low concentrations of 10^{-6} - 10^{-5} mol/L and vascular relaxation at high concentrations of > 10^{-4} mol/L[6].

Mean arterial pressure is calculated as cardiac output × SVR and stroke volume × HR × SVR. No change in HR after propofol administration was observed in our case. Even though we placed an arterial catheter, a pulse contour analysis or cardiac Doppler device was not used; regrettably, the cardiac index was not monitored. In addition, at the time of invasive BP monitoring, BP normalized. When propofol-induced hypertension is suspected, early monitoring of cardiac index to analyze the cause of hypertension is important.

Psychological factors, such as anxiety and stress, are one of the most common causes of perioperative hypertension. The patient in our case was comfortable when her emotional status was evaluated by her nurse (twice on admission and on the day of surgery). In addition, the mean preoperative BP at the ward was 19.3/10.5 (15.2-22.4/9.6-10.9) kPa, and BP at the time of entering the operating room was 18.8/11.3 kPa. Since her preoperative BP was controlled, we concluded that negative feelings before surgery were less relevant to high BP.

We had to exclude the possibility of undiagnosed essential hypertension even though the patient did not have any comorbidities. She had not been previously diagnosed with hypertension and had no family history of essential hypertension. In addition, as we described, her preoperative BP was stable. The preoperative electrocardiogram showed normal sinus rhythm and there was no cardiomegaly on chest radiography; therefore, we concluded that her BP had been well controlled.

No swelling on the injection site or disconnection of the infusion line was observed. In addition, BIS levels were maintained at approximately 40 throughout the surgery. When the concentration of propofol was increased to 9 μg/mL, a decrease in the BIS level to 7-9 was observed. The patient confirmed that there was no instance of wakefulness during the surgery. Therefore, it can be concluded that hypertension was not due to insufficient depth of anesthesia or wakefulness.

Owing to the suspicion of undiagnosed pheochromocytoma, surgery was suspended for approximately 10 min for observation. Pheochromocytoma could not be confirmed because abdominal computed tomography and hormonal tests were not performed. However, the possibility of pheochromocytoma was considered low as BP was consistently high without fluctuation, regardless of the surgical stimulation, and it stabilized after suspending propofol and switching to sevoflurane.

The possibility of hypertension caused by thyrotoxicosis was excluded since the preoperative thyroid hormone levels of the patient were normal with T3: 109 ng/dL, free T4: 0.98 ng/dL, and TSH: 1.74 μIU/mL. In addition, the patient had no symptoms of thyrotoxicosis such as tachycardia, weight loss, or heat intolerance.

In our case, there were several instances in which BP increased owing to propofol administration (Figure 1).

First, when anesthetic induction was initiated with a target concentration of 6 μg/mL of propofol and 3 ng/mL of remifentanil, BP increased from 18.8/8.8 kPa to 22.0/10.7 kPa, while HR decreased. Intubation was performed after increasing the propofol and remifentanil concentrations to 7.5 μg/mL and 4.5 ng/mL, respectively.

Second, after starting surgery, HR and BIS were maintained at 60-70 beats/min and 24, respectively; however, BP was 22.7-24.0/11.3-12.7 kPa. Therefore, the concentrations of propofol and remifentanil were increased from 5 to 9 μg/mL and 3 to 6 ng/mL, respectively. At that time, HR did not change significantly, and BIS decreased to 8; however, BP increased to 26.7-28.0/13.3-14.7 kPa.

Third, when labetalol (10 mg) was administered twice at 5-min intervals, BP decreased slightly under high concentrations of IV anesthetics. Labetalol is a non-selective alpha/beta-antagonist, and its effect as a vasodilator can be suppressed by vasoconstriction caused by high concentrations of propofol.

Fourth, although sevoflurane was administered at 5 vol%, systolic BP only decreased slightly from 26.7 kPa to 23.9 kPa. However, systolic BP abruptly decreased to 16.0-17.3 kPa within 3 min after suspending propofol infusion.

**CONCLUSION**

We concluded propofol administration was the cause of increased BP in our case after excluding multiple possible causes of severe hypertension. Although rare, anesthesiologists should consider the possibility of propofol-induced hypertension, and BP should be controlled in an appropriate and timely manner.
Figure 1 Anesthesia record sheet with significant events or intravenously administered drugs indicated with arrows. Arrow 1: Atropine 0.5 mg and glycopyrrolate 0.2 mg; Arrow 2: Labetalol 10 mg; Arrow 3: Labetalol 10 mg; Arrow 4: Surgery was suspended; Arrow 5: Sevoflurane inhalation was initiated; Arrow 6: Propofol administration was discontinued; Arrow 7: Invasive BP monitoring was initiated, and surgery was resumed; Arrow 8: Nicardipine 1 mg; X: Induction was started; T: Intubation was done; S: Surgery was started; F: Surgery was finished; E: Emergence was done. HR: Heart rate; SBP: Systolic blood pressure; DBP: Diastolic blood pressure; MBP: Mean blood pressure; SpO2: Saturation of percutaneous oxygen; RR: Respiratory rate; T1: Temperature 1; ISBP1: Invasive systolic blood pressure 1; IDBP1: Invasive diastolic blood pressure 1; IMBP1: Invasive mean blood pressure 1; VT: Tidal volume; ETCO2: End-tidal CO2; PIP: Peak inspiratory pressure; TOF: Train-of-four; BIS: Bispectral index; SPV: Systolic pressure variation; dPP: Delta pulse pressure; SEVO: Sevoflurane; HS: Hartmann solution; PSA: Plasma solution A; TCI PPF: Target-controlled infusion of propofol; TCI 1mg RFTi: Target-controlled infusion of 1mg remifentanil; VEC: Vecuronium.
### REFERENCES


