Article ID: WMC005733 ISSN 2046-1690

Can induction of general anesthesia with propofol and/or delivery of baby with cesarean section convert maternal atrial fibrillation into maternal sinus rhythm?

Peer review status:
No

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Article ID: WMC005733
Article Type: Case Report
Submitted on:08-Jul-2021, 02:06:54 AM GMT **Published on:** 30-Jul-2021, 05:00:15 AM GMT
Article URL: http://www.webmedcentral.com/article_view/5733
Subject Categories:ANAESTHESIA
Keywords: Propofol, Cesarean Section, Atrial Fibrillation, Spontaneous Conversion
How to cite the article: Gupta D, Lee K, Priebe G, Beydoun K. Can induction of general anesthesia with propofol and/or delivery of baby with cesarean section convert maternal atrial fibrillation into maternal sinus rhythm?. WebmedCentral ANAESTHESIA 2021;12(7):WMC005733

Source(s) of Funding:
Not Applicable

Competing Interests:
Not Applicable

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Case Report

There have been some case reports about propofol being antiarrhythmic [1-2]. Herein, after obtaining patient's informed and written consent,Â we want toÂ share aÂ caseÂ history wherein when delivery of baby with cesarean sectionÂ happened immediately (withinÂ four minutes) after inductionÂ of general anesthesia with propofol, it was unclear whether it was induction of general anesthesia orÂ delivery of baby that converted maternal atrialÂ fibrillation intoÂ maternal sinus rhythm.

A 24-year-old and 63.3 kilogram-weighing primigravida patient presented for elective induction of labor at 40 weeks. She hadÂ no significant past medical or surgical or social or family history. She reported no allergies. One hour after trans-cervical Foley balloon insertion and inflation for mechanical induction of laborÂ and immediately after receiving nalbuphine 10mg plus diphenhydramine 25mg intravenous bolus forÂ pain control, fetal deceleration and maternalÂ tachycardia were observed. Fetal deceleration resolved with maternal hands-and-knees position but maternal tachycardia with irregularÂ pulse persisted. Twelve-lead electrocardiogram confirmed maternal atrial fibrillationÂ with rapid ventricular rate response at 150s-160s. Patient denied any coexistent symptoms and her other vital signs were within normal limits. Patient was COVID-19 negative and had not received COVID-19 vaccination recently thus ruling out COVID-19 and its vaccination related cardiac changes [3].Â Cardiology team was consulted and their teamÂ recommended metoprolol 2.5-5mg intravenous boluses (scheduled as well as on as-needed basis) to target heart rate at 120s-130s, maintenance of magnesiumÂ at >2mg/dL plus potassium at >4mmol/L, and delivery of baby in case ofÂ fetal distress. Transthoracic echocardiogram was within normal limits. Esmolol infusion for heart rate control, computed tomography chestÂ to rule out pulmonary embolism,Â trans-esophageal echocardiogram to visualize cardiac valvular structures, cardioversion and anticoagulation were deferred for postpartum periodÂ pendingÂ urgent delivery of baby. Patient's heart rate did not respond to multiple intravenous doses of metoprolol.Â Urgent delivery of baby by cesarean section was planned. Considering her cardiac condition, it was debated whether slowly titrated epidural anesthesia or low dose spinal anesthesia should be utilized. Collaboratively, spinal anesthesia was decided but patient's persistent movement during attempts at spinal anesthesia led to abandonment of spinal anesthesia and pursuit of emergent general anesthesia for cesarean section. The thought to use etomidate for induction of general anesthesia consideringÂ maternal atrial fibrillation with rapid ventricular response was abandoned in favor of usingÂ propofol for induction ofÂ general anesthesia. General anesthesia was induced in rapid sequence with 150mg propofol (>2mg/kg) and 140mg succinylcholine (>2mg/kg) while maintaining cricoid pressure duringÂ GlideScopeÂ intubation of trachea. Phenylephrine 120mcg was given intravenously after tracheal intubation. WithinÂ four minutes, baby was surgically delivered and while placenta was beingÂ delivered surgically, normal sinus rhythm with normal heart rates at 100s was observed on the five-lead electrocardiogram on the anesthesia monitor. Patient vital signs remained stableÂ intraoperatively and postoperatively. Postoperatively, twelve-lead electrocardiogram confirmedÂ normal sinusÂ rhythm with normal heart rates in 80s. Patient did not need transfer to intensive care unit for heart rate control with esmolol infusion under continuous andÂ invasive arterialÂ bloodÂ pressureÂ monitoring. Trans-esophageal echocardiogram and cardioversion were not required. Computed tomography of chest ruled out pulmonary embolism. Subcutaneous heparin every eight hours wasÂ prophylactically initiated postoperatively. Intravenous metoprolol wasÂ converted to metoprolol 25mg by mouth twice a day. Additionally, patientÂ received magnesium 4g and potassium 40mEq postoperatively. The patient was planned to follow up outpatientÂ cardiology after discharge from postpartum floors.

This case highlights that if our team has had expected

propofol to potentially convert atrial fibrillation to normal sinus rhythm, our team would haveÂ discussed the consideration of elective generalÂ anesthesia for the patientÂ although it is still likely that our team mightÂ have pursued regional anesthesia considering its predictable safety profile for mother andÂ neonate as compared to general anesthesiaÂ related inadvertent and unpredictable conversion of atrial fibrillation to sinus rhythm. Moreover, as the things were moving very fast from inductionÂ of anesthesia to intubation of trachea to delivery of baby, the five-lead electrocardiogram's rhythmÂ was not specifically observed by our team to detectÂ unexpected conversion of atrial fibrillation toÂ sinus rhythm during theÂ intervening four-minute time period wherein propofolÂ in itself could have converted atrial fibrillation to sinusÂ rhythm even beforeÂ the intravenous dose of phenylephrine afterÂ intubation of trachea and thereafter much before the delivery ofÂ baby. Therefore, it was unclearÂ whether it was induction of general anesthesia orÂ delivery of baby that converted maternal atrialÂ fibrillation intoÂ maternal sinus rhythm. However, considering the historically available medical literature about propofol, it can beÂ certainly stated that propofol in itself contributedÂ (even if notÂ exclusively) towards conversion ofÂ maternal atrial fibrillation to normal sinus rhythm. Moreover, it remains unclear whetherÂ trans-cervicalÂ Foley balloon inflation or nalbuphine plus diphenhydramine combination causedÂ persistent atrial fibrillation or whether it wasÂ induction of labor and corresponding pains in predisposedÂ primigravida that led to atrial fibrillation [4-10] which got resolved with induction of anesthesia and thereafterÂ delivery of baby. Anyhow, admissionÂ toÂ intensive care unit and invasive trans-esophageal echocardiogramÂ followed by traumaticÂ electrical cardioversionÂ were avoided byÂ inadvertent resolution of atrial fibrillation with potential "chemical" cardioversion by anesthesia medications and potential "mechanical" or "physiological"Â cardioversion by delivery of baby. Interestingly, atrial fibrillation might have gotten started at the induction of labor pains and attempts at intravenous labor analgesia and gotten ended at the induction of general anesthesia and cesarean section delivery of baby.

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