**Introduction**

Although dexmedetomidine is gaining popularity for procedural sedation, it can be challenging to use as a sole agent for painful procedures. Ketamine offers a suitable adjunctive agent, as it counteracts the unwanted cardiovascular effects of dexmedetomidine, including hypotension and bradycardia, provides intense analgesia, and speeds the onset of action. There are limited and conflicting data regarding the use of these agents in patients with pulmonary hypertension.

We present a case using ketamine and dexmedetomidine (ketodex) successfully for sedation during a bone marrow aspirate and abscess drainage in a patient with pulmonary hypertension.

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**Case Report**

A 14-year-old, 63.5 kg African American male with Milroy disease with moderate to severe pulmonary hypertension who was status-post pulmonary embolectomy presented with pancytopenia and a left axillary abscess. Past medical history was significant for a right axillary abscess and multiple pulmonary emboli. Home medications included tadafil 20 mg daily and coumadin 5 mg daily.

In the operating room, standard American Society of Anesthesiologists monitors were placed. Oxygen was administered at 3 liters per minute and end-tidal carbon dioxide (CO2) was monitored using a nasal cannula. Dexmedetomidine 50 µg and ketamine 50 mg were administered as a bolus over 1 to 2 minutes followed by a dexmedetomidine infusion at 0.5 µg/kg/hour. Midazolam a total of 4 mg and fentanyl 50 µg were also administered. No change was noted in the oxygen saturation (99% to 100%) or ETCO2 (38 to 42 mmHg) following the procedure and during the bone marrow aspiration. The mean arterial pressure (MAP) remained at the baseline values of 67 to 80 mmHg with heart rate of 60 to 70 per beats/minute.

During transition to the incision and drainage of the left axillary abscess, there was a decrease if the MAP to 40 mmHg (71/43) with a HR of 60 beats/minute. This was treated with a single dose of phenylephrine 100 µg and the dexmedetomidine infusion was decreased to 0.3 µg/kg/hour. Following the procedure, the patient was transported to the post-anesthesia care unit. He denied memory of the procedure. He was discharged to the inpatient ward after 30 minutes of uneventful recovery.

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**Discussion**

The presence of pulmonary arterial hypertension (PAH) is a significant risk factor for perioperative complications. Agents and factors which precipitate an increase in pulmonary artery pressure (PAP) must be avoided. Procedural sedation can result in adverse effects on ventilatory function resulting in either hypoxemia or hypercarbia. Additionally, excessive effects on the systemic circulation with vasodilatation are a significant concern in these patients who are dependent on high systemic vascular resistance for right ventricular (RV) perfusion and maintenance of cardiac output and blood pressure. Additionally, specific sedative agents may directly affect PAP and pulmonary vascular resistance.

Dexmedetomidine with ketamine provided adequate sedation with limited effects on respiratory function. Although dexmedetomidine may result in a decrease in SVR, this can be easily treated and offset by the opposing hemodynamic effects of ketamine. The ketodex combination may limit the need for supplemental opioid analgesia. Further studies are needed to fully evaluate the effects of ketodex on the pulmonary vasculature.

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**References**