

# Anaesthetising Somalia's Tallest Man

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## Abstract

This case report presents what we believe to be the tallest individual in the world to ever undergo day case surgery. This is also the first time sugammadex has been used in someone with gigantism.

**Keywords:** Colonoscopy, Ambulatory surgery center, Bowel preparation, Colonoscope processing, Procedure time, Complications, Non-routine cases, Hypotension, Hypoxia, Patient outcomes.

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## Introduction

Gigantism is a non-specific term that refers to any standing height more than 2 SD above the mean for the persons sex, age and Tanner stage (i.e. Height Z score >+2). [1]

Increased height due to true gigantism is extremely rare, with the total number of reported cases in the hundreds. Correspondingly literature on anaesthesia in patients with gigantism is limited.

Acromegaly is more common, occurring at an estimated worldwide annual rate of 2.8-4 cases per million. The major difference between these two conditions is that gigantism is characterised by abnormally high linear growth while the epiphyseal growth plates are open during childhood and acromegaly results from growth hormone excess ensuing after epiphyseal fusion has occurred.

Patients with acromegaly have recognised physical manifestations including airway management, cardiac, gastrointestinal, musculoskeletal and renal problems. [2] The anaesthetic risks for acromegaly are applicable to patients with gigantism.

## Case Report

A 35-year-old male, ASA III, of Somalian descent with a confirmed diagnosis of a pituitary micro adenoma, who has to date declined any treatment. At pre-assessment he weighed 204kg and was 7ft 9in (BMI 37.5). He had no previous general anaesthesia. Significant past medical history included thyroid stimulating hormone (TSH) deficiency, partial adrenocorticotrophic (ACTH) deficiency and bitemporal heminopia. The patient was taking no regular medications and had no known allergies. Pre-operative investigations illustrated a mild normocytic anaemia and a negative sickle screen.

Clinical examination was remarkable for coarse facies, an enlarged mandible, widened nose and significant gyanecomastia. Examinations of respiratory and cardiac systems were otherwise unremarkable. Airway assessment showed prognathism, macroglossia and Mallampati A view. He had a good range of neck mobility and normal temporomandibular joint mobility. He had poor dentition and was having a total dental extraction.

Preoperative preparation included inviting the patient to the operating room three days in advance of surgery. Attention was

focused on preparation of the patient positioning, suitability of the table compared to the patients' weight and height, and anaesthetic equipment.

On the day of surgery, the patient walked into theatre and transferred himself on to a specially reconstructed table (made up of one operating table and three recovery trolleys combined) (see Figure 1). Basic standards of monitoring for a day case procedure were employed. [9]



Figure 1.

A gas induction was performed using sevoflurane 2-8%, 5 litres of oxygen and 5 litres of nitrous oxide. Size 4 guedel was inserted and his airway was easily maintained. Direct laryngoscopy was performed with a No. 5 Macintosh blade followed by 300 micrograms of fentanyl. Glottic opening was easily visualised, Grade I Cormack and Lehane Classification. Rocuronium 100mg (0.5 mg/kg) was given. Intubation of the trachea was achieved with a size 9 reinforced tube under direct visualisation.

Anaesthesia was maintained using desflurane (6-10%) and nitrous oxide (50%) in oxygen. Pressure-controlled ventilation was employed using a Drager Julian ventilator. He was ventilated to normocapnia. Tidal volumes of 900 ml and total minute volume of 11.1 litres per minute were achieved with inspiratory pressures of 19 cm H<sub>2</sub>O, respiratory rate of 12 breaths per minute, I: E ratio 1:2, and PEEP of 5 cm H<sub>2</sub>O.

Other analgesics and anti-inflammatories given were diclofenac 200mg (0.98 mg/kg) buffered in 0.9% saline, paracetamol 2.5g

(12.25 mg/kg) and dexamethasone 20mg (0.09mg/kg). Local anaesthetic dental blocks were also performed by the surgeons.

Total dental extraction was completed in 45 minutes. Neuromuscular block was reversed using sugammadex. Response of train of four monitoring (using a peripheral nerve stimulator over the ulnar nerve) before sugammadex was 1 twitch, and after an initial dose of 500mg of sugammadex (2.4mg/kg) was 4 twitches with no fade after one minute. This is a lower dose than the recommended (4mg/kg) however the nerve stimulator already indicated the patient was adequately reversed. The oropharynx was suctioned under direct vision. The patient was extubated in a semi seated position on the operating table where he was also given postoperative care. Recovery was uneventful and he was discharged home from the operating room after 180 minutes.

## Discussion

The anaesthetic care of patients with pituitary disease involves an understanding of the varied presentations and their implications for the patient's perioperative condition and management.

The focus of anaesthetic management was to achieve a smooth induction with maintenance of the airway and to prevent or control any potential haemodynamic instability. In these patients airway features include macroglossia, prognathism with malocclusion and hypertrophy of the laryngeal soft tissue, epiglottis and aryepiglottic folds.[3,4] Systemic features include hypertension, diabetes mellitus,[2] pulmonary dysfunction,[5] cardiomegaly and congestive cardiac failure, resulting from excess growth hormone. The incidence of difficult laryngoscopy and intubation in acromegalic patients is higher than in the normal patients.[6]

Risks are also present during the period of extubation. Anticipated complications include coughing, laryngospasm and breath-holding. Death from respiratory causes is three times more common in patients with acromegaly than in the general population and is often the result of upper airway obstruction.[7]

A major problem for the anaesthetist is the overgrowth of airway tissues, which makes patients susceptible to airway obstruction and difficult visualization of the vocal cords by laryngoscopy. Therefore all patients with gigantism should be considered difficult endotracheal intubation candidates. Airway assessment alerts the anaesthetist of the possibility of difficult intubation.

Four grades of airway involvement are described in acromegaly:

1. No significant involvement
2. Nasal and pharyngeal mucosa hypertrophy
3. Glottic involvement including glottic stenosis or vocal cord paresis
4. Combination of grade 2 and 3

For grade 3 & 4 either fiberoptic intubation or tracheostomy may be needed.

The height and weight of patient necessitated special attention to positioning and monitoring. A specially constructed table was used. Monitoring devices were attached prior to induction of anaesthesia and their use continued until the patient had recovered from the effects of anaesthesia. Resuscitation drugs were drawn according to the recommended doses used in clinical practice.

Sugammadex was chosen as the neuromuscular blockade reversal drug. It is a synthetic, modified gamma cyclodextrin and the only

available selective relaxant binding agent. The use of sugammadex produces a rapid, predictable offset of neuromuscular blockade from aminosteroid drugs (rocuronium, vecuronium) without the risk of re-curarisation and as such reduces the risk of potential airway complications both during and post-extubation. It has also been suggested that sugammadex is more effective than neostigmine in reversing muscle relaxation caused by neuromuscular blockade during surgery and is relatively safe. [13-15]

## Conclusion

Gigantism is a rare clinical finding. The clinical features shared with acromegaly include thickened tissues of the upper airway predisposing to airway obstruction.8 An increased incidence of death as a direct result7 demands careful preparation to reduce this risk. There is additional challenge to identify equipment of suitable size and strength. Sugammadex was chosen to provide a rapid, predictable and complete offset of neuromuscular blockade to reduce the risk of potential airway complications both during and post-extubation.

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