The Aortic Uncrossing Procedure

Objective: Advanced imaging allows identification of rare vascular ring patients with a circumflex aorta. The key diagnostic feature is crossing of the transverse aortic arch from right to left posterior to the trachea and superior to the carina in a patient with a right aortic arch. The surgical treatment of children with a circumflex aorta remains controversial. We reviewed our series of patients that had an aortic uncrossing procedure for a circumflex aorta to evaluate the results.

Methods: We reviewed all patients who had aortic uncrossing at two institutions from 2002–2022. All patients had preoperative CT imaging and pre- or intraoperative bronchoscopy.

Results: Ten patients ranging in age from 1.5 to 10 years (median 4 years) underwent aortic uncrossing. Two patients had prior ligamentum division and two patients had prior left aortic arch division. All patients had significant clinical symptoms of stridor, exercise intolerance, and/or dysphagia. Eight patients had deep hypothermic circulatory arrest (DHCA) (mean 34 minutes) and the most recent two patients had modified cerebral perfusion (mean 37 minutes). Postoperative length of stay ranged from 4 to 31 days (median 5 days). One patient required a temporary tracheostomy for bilateral recurrent laryngeal nerve paresis. Both nerves recovered and there were no other neurologic complications. One patient required an aortic extension graft to alleviate esophageal compression from an unusual ectatic esophageal course. All patients currently have had relief of airway symptoms and dysphagia.

Conclusion: In properly selected patients with a right aortic arch and circumflex aorta, aortic uncrossing is a safe and effective therapy to treat airway and esophageal compression. The procedure can be conducted with either DHCA or modified cerebral perfusion. Careful attention to the location of the esophagus and recurrent laryngeal nerves is required.

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