

Review of recoarctation angioplasty rate and associated mortality rate at OLCHC in the three year period, 2013 to 2016.

The cardiac department in OLCHC conducted a review of the incidence and the results of recoarctation balloon angioplasty at Our Lady's Children's Hospital following identification of the higher mortality rate in Our Lady's Children's Hospital as compared to other units returned data to NICOR in the United Kingdom.

The recent three year results (April 2013- March 2016) show that OLCHC intervened on 22 cases of recoarctation using balloon angioplasty and following this intervention 3 patients died within 30 days.

The majority of the recoarctation cases had had previous surgical repair of a hypoplastic aortic arch and coarctation (12 patients) as the first stage of a single ventricle pathway (Norwood, DKS and BT shunt or Sano). Two further single ventricle patients underwent balloon dilation of a recoarctation following a hybrid Norwood procedure (bilateral pulmonary artery banding and ductal stenting). The remaining eight patients had two ventricle physiology and developed a recoarctation following primary stenting of a native coarctation (3 patients), extended arch aortoplasty for a hypoplastic aortic arch repair via a thoracotomy (2 patients), interrupted aortic arch and VSD repair (1 patient), hypoplastic aortic arch repair via sternotomy and pulmonary artery banding (1 patient) and one patient following arterial switch operation and hypoplastic aortic arch repair via sternotomy.

Review of the submitted NICOR data concerning the 22 recoarctation balloon angioplasty events revealed a number of issues. All three deaths occurred in the 14 single ventricle patients that had undergone a surgical Norwood (2 patients of 12) or a hybrid Norwood (1 of 2 patients). One surgical Norwood patient appeared twice in this group as this patient had two balloon angioplasties during this time period. Furthermore, of the 12 surgical Norwood patients with a recoarctation treated by balloon aortoplasty during the study period, eight had undergone other redo procedures for recoarctation. One had a redo aortic arch repair and seven had previously had recoarctation stenting and one or more balloon dilations of a recoarctation outside of the review period.

During the same period (2013-2016) 23 patients underwent recoarctation stenting. There was one death within 30 days in this patient group among 7 single ventricle patients. The remaining stented patients all had two ventricle circulations and survived.

The review identified a further 10 patients who also had a recoarctation balloon angioplasty but they were not included, as the other procedure performed at the time of the balloon aortoplasty such as pulmonary artery stenting, was considered the primary procedure using the NICOR hierarchical table for specific procedures.

On detailed review of the deaths, they occurred in patients who had a recoarctation balloon angioplasty on a background of an aortic arch repair associated with single ventricle palliation.

It should be noted that during the three year period 48 number of cases underwent aortic arch repair as part of a single ventricle palliation (Norwood 40, DKS 5, Arch repair on bypass 3) and that the 30day survival rate in OLCHC for the first stage of the single ventricle pathway (Norwood) is 97% (2012-2015)

Similar to other units with excellent early survival rates for the first stage of the single ventricle pathway OLCHC has noted that some of these infants with poor ventricular function ultimately succumb to their underlying cardiac condition. The unit on review has shown that the infants who died following re-coarctation angioplasty had the angioplasty to relieve a coarctation gradient in an effort to preserve very poor single ventricle ventricular function.

As part of a larger review the unit plans to review repair techniques and patch types used for the repair of hypoplastic arches and the incidence of recoarctation to try and assess the potential influence of these on recoarctation rates over the last 10 years in OLCHC.

Using the NICOR data it should be possible to assess the incidence of recoarctation in single ventricle (arch repairs, DKS, Norwood) patients across the UK and compare them to the OLCHC results to see how many in the collaborative NICOR data had re-intervention on the arch.