

Open total aortic arch reconstruction for patients with advanced age in the era of endovascular repair

Arudo Hiraoka, MD, Genta Chikazawa, MD, PhD, Toshinori Totsugawa, MD, PhD, Masahiko Kuinose, MD, PhD, Kentaro Tamura, MD, Taichi Sakaguchi, MD, PhD, and Hidenori Yoshitaka, MD, PhD

Background: The aim of this study is to evaluate the influence of advanced age on the postoperative course in open aortic arch repair using hypothermic circulatory arrest and selective antegrade cerebral perfusion.

Methods: Of 158 consecutive patients who underwent open total arch repair between 2008 and 2012, we retrospectively compared outcomes between octogenarians (group E: mean age, 83.0 ± 3.1 years [$n = 40$]) and their younger counterparts (group Y: mean age, 68.2 ± 10.2 years [$n = 118$]), and evaluated risk factors for an adverse postoperative course.

Results: The overall 30-day mortality was 7.0% (11/158), and by excluding 54 emergent cases, 30-day mortality was 4.8% (5/104). Ruptured cases were significantly observed in group E (17.5% [7/40] vs 3.4% [4/118]; $P = .006$). There were no significant differences in postoperative early results, including neurologic adverse events (12.5% [5/40] vs 6.8% [8/118]; $P = .317$) and 30-day death (12.5% [5/40] vs 5.1% [6/118]; $P = .147$) between groups E and Y. Multivariate logistic analysis revealed rupture, preoperative consciousness disorder, and extended circulatory arrest time (≥ 67 minutes) were risk factors for serious complications (neurologic adverse events and 30-day death) (odds ratio [OR], 10.9 [$P = .010$]; OR, 5.2 [$P = .040$]; and OR, 3.5 [$P = .028$], respectively). A ruptured aorta was detected as an independent predictor of postoperative extended intensive care unit and hospital stay by multivariate linear regression analysis ($P = .001$ and $P = .007$, respectively).

Conclusions: Advanced age was not associated with serious postoperative complications and adverse postoperative course. (J Thorac Cardiovasc Surg 2014;148:77-82)

Longer life expectancy and various developments in medicine can increase the number of patients with advanced age who require the treatment of aortic aneurysms. A combination of hypothermic circulatory arrest (HCA) and selective antegrade cerebral perfusion (SACP) is an established option, and both the safety and efficacy have been verified in many reports.¹⁻⁵ However, advanced age is one of the most significant risk factors for fatal complications and high mortality in open aortic arch repair.⁶⁻⁸ However, age was not reported to be associated with high mortality and neurologic adversity in surgical repair with HCA.⁹ Although the indication for thoracic endovascular aortic repair has been expanding rapidly in this decade, the optimal strategy for the treatment of aortic arch disease in elderly patients has not been determined.

In our institution, the average age of patients who underwent open total arch repair (TAR) was high (72 ± 11 years), and the aim of this study was to analyze early outcomes in octogenarians after open TAR with HCA and SACP, compared with their younger counterparts, and to evaluate risk factors for an adverse postoperative course.

PATIENTS AND METHODS

Between January 2008 and May 2012, 162 consecutive patients underwent open total aortic arch repair without using thoracic endovascular aortic repair at a single cardiovascular institute. Of these patients, 3 with infected aneurysm and 1 with inflammatory aneurysm were excluded. Of the remaining 158 patients, octogenarians included 40 (25%). We excluded patients with preoperative complete unconsciousness and extremely low activities of daily living as candidates for open TAR.

Preoperative consciousness disorder was defined as transient neurologic disorder within 24 hours before operation, and patients with recovery from consciousness disorder were included as candidates. We retrospectively compared early outcomes between a contemporary series of patients 80 years or older (group E: $n = 40$) and younger than 80 years (group Y: $n = 118$) who underwent open TAR with HCA and SACP. This study was approved by the institutional review board.

Surgical Technique

After general anesthesia and intubation, transesophageal echocardiography and transcutaneous cerebral oximetry (INVOS 3100-SD; Somanetics Co, Troy, Mich) monitoring were routinely performed. Skin incision was made as shortly as possible for median sternotomy, and an incision of less than 20 cm was found in 56 patients (35%). The femoral artery and bicaval

From the Department of Cardiovascular Surgery, The Sakakibara Heart Institute of Okayama, Okayama, Japan.

Disclosures: Authors have nothing to disclose with regard to commercial support. Received for publication April 15, 2013; revisions received July 1, 2013; accepted for publication July 18, 2013; available ahead of print Sept 16, 2013.

Address for reprints: Arudo Hiraoka, MD, Department of Cardiovascular Surgery, The Sakakibara Heart Institute of Okayama, 2-5-1 Nakaicho, Kita-ku, Okayama 700-0804, Japan (E-mail: bassbord1028@yahoo.co.jp).

0022-5223/\$36.00

Copyright © 2014 by The American Association for Thoracic Surgery

<http://dx.doi.org/10.1016/j.jtcvs.2013.07.042>

Abbreviations and Acronyms

CI	= confidence interval
CPB	= cardiopulmonary bypass
eCCr	= estimated creatinine clearance
HCA	= hypothermic circulatory arrest
ICU	= intensive care unit
OR	= odds ratio
SACP	= selective antegrade cerebral perfusion
TAR	= total arch repair

cannulations were used to establish cardiopulmonary bypass (CPB). The right or left axillary artery was mainly added in the patients with aortic dissection or severe atherosclerosis. In patients with severe atherosclerosis in the aorta, femoral artery perfusion was mainly used to flush out debris after open distal anastomosis. Left atrial venting was initiated through the right upper pulmonary vein. Exposures of 3 cerebral branches and distal arch were comfortably achieved by using the Martin Arm Retractor (LTL Medical LLC, Simi Valley, Calif). After cooling to 25°C for circulatory arrest, cardiac arrest was achieved by antegrade and selective deliveries of cardioplegic solution into both coronary orifices, and SACP was established by inserting balloon catheters into the 3 cerebral branches. When cannulation of the right axillary artery was used, the brachiocephalic artery was clamped for cerebral perfusion without using a balloon catheter. The distal aortic arch was separated off completely at the borderline between the lesion and normal aorta, and a stepwise technique was generally used for distal anastomosis in 90 patients (57%). We directly anastomosed with a 4-branched prosthetic graft, if at all possible, by using 3 different techniques (Figure 1, A to C).¹⁰ We selected the optimal technique by the etiology, size of aneurysm, and intraoperative working space. After antegrade perfusion from the branch of the graft was restarted, the left subclavian artery was subsequently reconstructed. Typically, after proximal anastomosis to the aorta was performed and coronary perfusion was restarted, the left common carotid artery and the brachiocephalic artery were reconstructed in order (119 patients [75%]). However, when cardiac arrest time was prolonged, proximal anastomosis to the aorta was performed before reconstruction of 3 cerebral vessels (12 patients [8%]). However, in the patients with a normal ascending aorta and without a deeply located left subclavian artery, proximal anastomosis of a branched graft to the aorta was initially performed under aortic clamp during a cooling period. Subsequently, the distal aorta and 3 cerebral vessels were reconstructed in order (27 patients [17%]).

Statistical Analysis

Continuous data were presented as mean \pm SD, and were analyzed using 2-tailed *t*-tests or compared with a Mann-Whitney test for independent data, as appropriate. Categorical variables are given as a count and percentage of patients and compared using the χ^2 or Fisher exact test. The correlation between age and postoperative data was assessed using Pearson correlation coefficient. Multivariate linear regression analysis, including significant parameters detected by univariate analysis (at a significance level of $P < .1$), was used to evaluate the most significant determinants of postoperative length of intensive care unit (ICU) and hospital stay. Univariate analysis was performed on all variables to detect potential risk factors for postoperative serious adverse complications (permanent neurologic adverse events and postoperative 30-day death). In association with these complications, all continuous parameters were dichotomized at the 25th, 33rd, 50th, 66th, and 75th percentiles, and the percentile value with the lowest *P* value was chosen as the threshold for logistic regression analysis. The univariate predictors with $P < .1$ were selected by a stepwise method and entered into the multivariate logistic regression. $P < .05$ was considered significant. All data were analyzed using the Statistical Analysis Systems software JMP 9.0 (SAS Institute Inc, Cary, NC).

RESULTS**Patient Demographics**

The mean patient age was 71.9 ± 11.0 (range, 35-92) years, and the average age was 83.0 ± 3.1 years in group E and 68.2 ± 10.2 years in group Y. Group E had a lower mean body surface area (1.53 ± 0.17 vs 1.66 ± 0.21 m²; $P = .001$) and estimated creatinine clearance (eCCr; 51.6 ± 63.2 vs 70.8 ± 34.3 mL/min; $P < .001$) compared with group Y. Preoperative and postoperative creatinine clearance was estimated by using the Cockcroft-Gault formula. Regarding etiology, aortic dissection was mainly seen in group Y, and more ruptured cases were observed in group E. An emergency operation was performed in 54 patients (34%), with no significant difference between the 2 groups. The mean aortic insufficiency grade was greater in group E. A comparison of preoperative characteristics is shown in Table 1.

Operative Data

Although the average operative time was significantly shorter in group E, there were no significant differences in CPB, cerebral perfusion, circulatory arrest, and cardiac arrest time. More patients with axillary artery cannulation and use of elephant trunk were seen in group Y. Aortic valve replacement and coronary artery bypass grafting were mainly performed as a concomitant cardiac surgery (aortic valve replacement, 25 patients; and coronary artery bypass grafting, 38 patients). There were significantly more patients requiring concomitant cardiac surgery in group E. Table 2 shows a comparison of operative data between groups E and Y.

Postoperative Data

The overall 30-day mortality was 7.0% (11/158), and by excluding 2 ruptured cases who died within 24 hours after emergent operation, 30-day mortality was 5.7% (9/158). The overall in-hospital mortality was 8.9% (14/158). There were no significant differences in 30-day and in-hospital deaths (12.5% [5/40] vs 5.1% [6/118] [$P = .147$]; and 15.0% [6/40] vs 6.8% [8/118] [$P = .193$], respectively) between groups E and Y. Causes of death included 1 fatal arrhythmia, 2 infections, 1 low cardiac output, and 1 vascular related in group E and 1 bleeding, 2 infections, 1 neurologic event, 1 pneumonia, and 1 multiorgan failure in group Y. There was no significant difference in postoperative neurologic adverse events (12.5% [5/40] vs 6.8% [8/118] [$P = .317$]) and other severe complications between groups E and Y. In patients with elective and emergent operations ($n = 104$ and 54, respectively), neurologic adverse events occurred in 6 (5.8%) and 7 (13.0%), and 30-day death was found in 5 (4.8%) and 6 (11.1%), respectively. An emergent operation did not significantly correlate with neurologic adverse events and 30-day death ($P = .135$ and $.188$, respectively). Although postoperative eCCr was significantly lower in group E (33.0 ± 16.1 vs 53.3 ± 27.1 mL/min; $P < .001$), the change rate of eCCr between

Download English Version:

<https://daneshyari.com/en/article/2980747>

Download Persian Version:

<https://daneshyari.com/article/2980747>

[Daneshyari.com](https://daneshyari.com)