

Robot-assisted Hybrid Coronary Revascularisation: Systematic Review



Nelson Wang, BSc^a, Jessie J. Zhou, BMed^b, Steven Phan, BSc^a,
Tristan D. Yan, FRACS^c, Kevin Phan, BSc^{a,b,c*}

^aSydney Medical School, University of Sydney, Sydney, NSW, Australia

^bFaculty of Medicine, University of New South Wales, Sydney, NSW, Australia

^cThe Collaborative Research (CORE) Group, Macquarie University, Sydney, NSW, Australia

Received 17 March 2015; received in revised form 29 May 2015; accepted 8 June 2015; online published-ahead-of-print 14 July 2015

Background

Hybrid coronary revascularisation (HCR) for multi-vessel coronary artery disease combines surgical bypass grafting for the left anterior descending (LAD) coronary artery and percutaneous coronary intervention (PCI) for non-LAD coronary arteries. The present systematic review was conducted to assess the available evidence on robotic-assisted HCR and explore the potential advantages and disadvantages it proposes.

Methods

A comprehensive search from six electronic databases was performed for studies reporting outcomes for robotic-assisted hybrid coronary revascularisation. Eight studies were identified from six electronic databases amenable for qualitative assessment and pooled quantitative analysis.

Results

There were no in-hospital deaths reported. Pooled myocardial infarction rates was 1.2% (range 0–3.7%), pooled strokes was 0.8% (range: 0–1.7%), freedom from reintervention was 92.5% (range 70.4–100%), and freedom from angina was 92.9% (range 74.3–100%). LITA patency ranged from 89–100%, while hospital stay ranged from 4–8.1 days.

Conclusions

The current data suggests potentially acceptable mortality and complication rates, when patients are carefully selected and operated on by expert cardiovascular teams. However, due to the heterogeneous nature of the evidence and lack of long-term outcomes, this promising technique warrants future comparative and randomised studies before becoming a part of mainstay coronary interventions.

Keywords

Robotic • Hybrid • Coronary revascularisation • CABG • PCI

Introduction

Coronary artery bypass grafting (CABG) has traditionally been the preferred approach for treatment of multi-vessel coronary disease, providing long-term survival benefit and reduced major cardiac and cerebrovascular events [1,2]. However, CABG is also invasive and associated with greater trauma [3] compared to percutaneous coronary intervention (PCI), due to the requirement of cardiopulmonary bypass and open sternotomy. There has been an increasing

emphasis on minimally invasive techniques in coronary vascularisation and valvular interventions in recent years [4–6]. Hybrid coronary revascularisation (HCR) is a recently introduced treatment approach [7] which aims to achieve complete coronary revascularisation with outcomes comparable to that of CABG for left anterior descending (LAD) lesions but retaining the minimally invasive nature of PCI for non-LAD lesions. In multi-vessel disease patients undergoing HCR, a minimally invasive direct CABG (MIDCAB) is often preferred for bypass of the LAD with the internal thoracic

*Corresponding author at: Corresponding to and reprint requests: Kevin Phan, Sydney Medical School, University of Sydney, Sydney, NSW, Australia, Email: kphan.vc@gmail.com

artery (ITA). HCR offers the potential advantages of more rapid recovery, lower complication rates and reduced surgical trauma for the patient [5,8–10].

In the current era, rapid technological advances in the realm of robotics have the potential to further reduce invasiveness and minimise surgical trauma. Endoscopic, robotic-assisted techniques have been employed in vessel harvest for MIDCAB, with acceptable short-term mortality and morbidity rates. Recent studies have utilised robotic-assisted techniques in HCR [9,11,12]. It is important to continually assess and evaluate these innovative surgical approaches, and compare results with those currently achieved by standard practice. Thus, the current systematic review was conducted to assess the post-operative outcomes in order to determine the feasibility of robotic-assisted HCR.

Methods

Literature Search Strategy

Electronic searches were performed using Ovid Medline, PubMed, Cochrane Central Register of Controlled Trials (CCTR), Cochrane Database of Systematic Reviews (CDSR), ACP Journal Club, and Database of Abstracts of Review of Effectiveness (DARE) from their date of inception to September 2014. To achieve the maximum sensitivity of the search strategy, we combined the terms: “robotic”, “hybrid coronary revascularization”, “integrated OR combined revascularization”, “minimally invasive coronary bypass”, and “percutaneous coronary intervention” as either key words or MeSH terms. The reference lists of all retrieved articles were reviewed for further identification of potentially relevant studies, assessed using the inclusion and exclusion criteria [13].

Selection Criteria

Eligible studies for the present systematic review and meta-analysis included those in which patient cohorts underwent robotically-assisted hybrid coronary revascularisation, an integrated procedure which includes coronary artery bypass grafting and percutaneous coronary intervention. Studies that did not use robotically-assisted interventions or did not include mortality or complications as endpoints were excluded. When institutions published duplicate studies with accumulating numbers of patients or increased lengths of follow-up, only the most complete reports were included for quantitative assessment at each time interval. Reference lists were also hand-searched for further relevant studies. All publications were limited to those involving human subjects and in the English language. Abstracts, case reports, conference presentations, editorials, reviews and expert opinions were excluded.

Data Extraction and Critical Appraisal

All data were extracted from article texts, tables and figures. Two investigators independently reviewed each retrieved article. Data collected included study characteristics, baseline

characteristics of the included cohorts, operations parameters and postoperative outcomes. Discrepancies between the two reviewers were resolved by discussion and consensus. The available main perioperative and postoperative variables were calculated with confidence intervals to generate pooled results. The postoperative outcomes include in-hospital survival, post-operative MI, strokes, AF and freedom from re-intervention and angina. The final results were reviewed by senior investigators (T.D.Y).

Results

Quality Appraisal

A total of 370 studies were identified from six database searches and five studies from other sources such as reference lists (Figure 1). After removal of duplicate studies, 364 studies remained for title and abstract screening. Following this, 344 studies were excluded and 20 studies remained for full-text article eligibility assessment. After full-text appraisal, 12 studies were excluded since they were comment/opinion articles (three studies), studied overlapping populations or follow-up reports (six studies), or did not employ robotically-assisted or robotic hybrid coronary revascularisation (three studies). Finally, eight studies with 430 robotically-assisted hybrid coronary revascularisation patients remained for inclusion in qualitative and quantitative synthesis (Table 1). Baseline patient characteristics and operational characteristics of included studies are summarised in Tables 2 and 3, respectively.

All included studies [9,11,12,14–18] were observational cohort studies, including one comparative study [12] between hybrid revascularisation and off-pump coronary artery bypass surgery. There were four studies with greater than 50 patients [9,11,15,18] and four studies with fewer than 50 patients [12,14,16,17]. Four studies reported mean follow-up periods within 12 months [12,14,16,18], and four studies reported follow-up periods greater than 12 months [9,11,15,17].

Operation duration was reported by four studies [9,12,14,15]. Intensive care unit (ICU) stay duration was reported by four studies [9,12,15,18], while six studies reported hospital stay duration [9,11,12,15,17,18]. All studies reported in-hospital survival rates. Postoperative myocardial infarction outcomes were reported in six studies [11,12,15–18], while stroke incidence was reported in six studies [9,11,12,15,16,18]. All studies reported freedom from re-intervention rates, while all but one study [12] reported freedom from angina rates. Postoperative outcomes are summarised in Table 4.

Patient Selection and Interventional Details

Inclusion criteria for the studies across the board were patients with multi-vessel disease in which the left anterior descending (LAD) lesion was not suitable for PCI but suitable for surgical revascularisation, as well as non-LAD lesions

Download English Version:

<https://daneshyari.com/en/article/5959011>

Download Persian Version:

<https://daneshyari.com/article/5959011>

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