

Long Coronary Lesions Requiring Long Stents >20 mm. Analysis And Outcome In Patients Treated At Queen Alia Heart Institute

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Abstract

Objective: To determine the outcome after using long coronary stents >20 mm for long coronary lesions among patients treated at Queen Alia Heart Institute.

Methods: This is a descriptive, and a retrospective non randomized study which was conducted at Queen Alia Heart Institute on 900 adult patients who underwent coronary angiography and intervention for either stable or unstable angina pectoris during the period between 2006 to 2011. Those patients had coronary intervention using a single long stent for each long lesion (>20 mm). Their follow up was analyzed and the outcome of these long stents was studied for in stent restenosis or in stent total occlusion in each specific coronary artery. A specially designed form was used to record the following data in the involved patients: age, gender, size and type of coronary stent (drug eluting or bare metal), the presence of diabetes mellitus, hypertension or hypercholesterolemia, and the status of the left ventricle.

Results: The total number of patients who had long coronary stent intervention was 900 cases. Four hundred eighty patients (53.3%) had restudy cardiac catheterization within 6-8 months, which showed in stent restenosis or in stent total occlusion in 90 patients. Males constituted the majority (88.9%) of the affected patients. Smoking was the commonest (83.3%) factor associated with in stent restenosis followed by Diabetes Mellitus (61.1%). About half the cases of long in stent restenosis was found in left anterior descending artery, whereas right coronary artery and circumflex artery had almost equal ratios: 23.3% and 22.2% respectively. Long in stent restenosis was commoner (33.3%) in ostial lesions and was the least (14.5%) in mid segment lesions. Bare metal stents were associated with the majority (77.8%) of cases of in stent restenosis. About two thirds of the affected patients had small caliber stents (2.5 and 2.75 mm diameter).

Conclusion: In stent restenosis or in stent total occlusion in long coronary stents is a well recognized and not uncommon clinical entity. Men are more commonly affected than women. Ostial left anterior descending artery is more affected than other coronaries. Smoking, Diabetes Mellitus and the use of bare metal stents of small sized caliber (≤ 2.75 mm) were

common in our study patient population and associated with increased incidence of long instent restenosis.

Keywords: long coronary lesions; Instent restenosis

Introduction:

Stent implantation has significantly reduced the short and long term complications in patients undergoing percutaneous coronary intervention compared with angioplasty alone. (Fischman et al., 1994)

Many studies that evaluated the outcome of treating patients with coronary stents have identified a series of risk factors associated with restenosis. One of which was the length of the diseased segment of the coronary artery and subsequently the length of the stent used to treat that lesion. (Bauters et al., 1998 & Mercado et al., 2001 & Hausleiter et al 2002)

In fact, the lesion length was considered as an independent factor for early complications and late restenosis following balloon angioplasty. (Rensing et al., 1993 & Hermans et al., 1993)

Although the introduction of coronary stents has resulted in a considerable reduction in restenosis rate of long lesions, it is still relatively significant and the stented segment length is an independent predictor of instent restenosis. (Lee et al., 2001)

However, Drug eluting stent implantation has been proved to markedly reduce the incidence of restenosis across a wide range of coronary lesions. (Lemos et al., 2004 & Ong et al., 2005) , In this report, we investigate the clinical and angiographic outcome of single long

coronary stenting for long lesions in a consecutive group of 480 patients who were treated with at least 20 mm of stent length.

Methods:

This is a descriptive and a retrospective non- randomized study which was conducted at Queen Alia Heart Institute in Amman – Jordan, during January 2006 to January 2011, on 900 adult patients (>18 years) who underwent coronary angiography and intervention during that period because of either stable or unstable angina.

The involved patients had coronary intervention for long lesions requiring long stents > 20 mm. Restudy cardiac catheterization was done for 480 patients who had recurrence of angina, new electrocardiographic ischemic changes or positive treadmill stress test on follow up clinic visit within 6-8 months since the original coronary intervention.

Their follow up at clinic was analyzed and the angiographic outcome of these long stents was studied for instent restenosis or instent total occlusion in each specific coronary artery considering the site of the lesion, and the size and type of coronary stent used (drug eluting or bare metal). Instent restenosis was considered present if it exceeded 50% stenosis.

A specially designed form was used to collect the following relevant data for the involved patients: age, gender, smoking, the presence of diabetes mellitus, hypertension or hypercholesterolemia, and the status of the left ventricle.

Left ventricular function was assessed by 2-D echocardiography.

Results:

The age of the study patient population ranges from 40 to 79 years.

Table I presents the frequency of long stents in-stent restenosis or in-stent occlusion among the study group which was 90 patients (18.8%). Males were the majority (88.9%) of patients with long in-stent restenosis.

Table II shows the distribution of cases of long stents in-stent restenosis according to different age groups. The commonest (33.8%) in males was the age group 40-49 years, and the commonest (70.0%) in females was the age group 70-79 years.

Long in-stent restenosis was not seen in women below the age of 60 years.

Table III demonstrated the possible factors associated with increased risk of in-stent restenosis, smoking was the commonest (83.3%) followed by Diabetes Mellitus in 61.1% of cases, whereas hypercholesterolemia being the lowest (11.1%). Almost half the cases of in-stent restenosis occurred in patients with normal left ventricle on 2-D echocardiography and the second half occurred in patients with left ventricular impairment.

As illustrated in table IV, left anterior descending coronary was the commonest (54.5%) affected artery, while right coronary and circumflex arteries had almost equal ratios; about a quarter for each, with the ostial segment being the commonest (33.3%) part of the coronary arteries to be involved in long in-stent restenosis followed by the proximal segment (28.9%) while the mid segment was the least (14.5%) to be affected, as can be seen in table V.

As can be observed in table VI, long stents restenosis was commoner (77.8%) with bare metal stents and the majority of them were small caliber (≤ 2.75 mm), as table VII demonstrates.

Discussion:

Since the mid nineties, particularly after the provision of a new generation of stents, the intervention treatment of long coronary lesions has become routinely adopted, as the in-hospital and late results are almost similar to those reported in the treatment of focal lesions.^(Freed et al., 1996 & Ruygrok et al., 1996) The frequency of long in-stent restenosis in our study was 18.8%. This tendency is lower than the ratio found in other reports ^(Kim et al., 2006 & Kim et al., 2001 & Kim et al., 1998 & Foley et al., 2001) of patients referred for coronary angiography with subsequent long stents implantation. Nevertheless, other studies ^(Kim et al., 2006) reported even a lower rate of in-stent restenosis than what was obtained in our trial. This variable frequency of long in-stent restenosis in the literature can be

explained partly by the difference in the lesions length considered in the different studies, and the variety of stent types and designs employed by these studies. Besides, there should be essential variations between patients clinical baseline and angiographic and lesions characteristics, in addition to the dissimilar deployment techniques and antithrombotic therapy protocols.

We believe, the real frequency of long instent restenosis could be higher than the ratio obtained in this study, because only 53.3% of patients who had long stents intervention were subjected to restudy cardiac catheterization due to their symptoms, while the remainders asymptomatic patients were not studied although they could have silent instent restenosis. One another relevant point is the restudy timing of the involved patients was relatively short (6–8 months), if the period was extended, for example, to one year the rate of instent restenosis would be higher. Long instent restenosis appears to be more common in males than in females in our study which is similar to other reports (Samad et al., 2011 & Luiz et al., 1999) with the commonest age group 40–49 years to be affected. This may reflect the selectivity and prejudice of female referrals for cardiac catheterization and angiography with coronary intervention.

The most frequent risk factors in our study associated with long instent restenosis were smoking and diabetes mellitus. This was consistent with what was reported in

the literature. (Luiz et al., 1999 & Gaku et al., 2006 & Lee et al., 2006 & Hoffmann et al., 2000)

Hypertension and hypercholesterolemia were also involved, but to a lesser extent. All these factors can be expected to be associated with instent restenosis as they are already part of the risk factors group for coronary artery atherosclerosis.

This study showed a higher prevalence of the left anterior descending coronary artery to be involved in instent restenosis especially in the ostial and proximal segments.

A finding that agreed with what was reported in other studies. (Kim et al., 1998 & Foley et al., 1994 & Kuntz et al., 1992)

This raised the question of considering left anterior descending artery itself as an independent predictor of restenosis after long stent implantation. Similar to the findings in other reports, (Kim et al., 2006 & Samad et al., 2011 & Dawkins et al., 2005 & Kim et al., 2011) most cases of restenosis in this study occurred in patients with bare metal stents of small diameter (≤ 2.75 mm), while drug eluting stents have been shown to reduce restenosis across a wide spectrum of stents lengths and diameters. So a lower ratio of restenosis could be achieved, as bare metal stents constituted the majority of stents used in our study because of some logistic issues we used different types of bare or drug eluting stents depending on their availability once the procedure performed.

Our study did not examine the outcome beyond eight months, whereas longer-term assessment may provide useful

knowledge regarding the occurrence of late restenosis after drug eluting coronary stent implantation.

Finally, Stent implantation for long coronary lesions is associated with excellent procedural success rates in the

majority of cases. However the restenosis rate is relatively high, since multiple factors including vessel diameter, lesion location, anginal status, diabetic status and extent of vessel disease also play important determining roles.

Table I: Frequency of long stents ISR and according to gender

Total no. of pts who had long coronary stents	No. of symptomatic pts who had restudy cath (%)	No. of patients with long stent ISR (%)	Male (%)	Female (%)
900(100%)	480(53.3%)	90(18.8%)	80(16.7%)	10(2.1%)
%		100%	88.9%	11.1%

ISR: in stent restenosis

Table II: Distribution of patients with long stents ISR or stent occlusion according to different age groups and gender

Age group (years)	No. of males (%)	No. of females (%)	Total (%)
40 – 49	27 (33.8%)	0 (0.0%)	27 (30.0%)
50 – 59	22 (27.5%)	0 (0.0%)	22 (24.4%)
60 – 69	14 (17.5%)	3 (30.0%)	17 (18.9%)
70 – 79	17 (21.2%)	7 (70.0%)	24 (26.7%)
Total	80 (100%)	10 (100%)	90 (100%)

ISR: in stent restenosis

Table III: General analysis of patients with long stents ISR or stent occlusion in respect to certain risk factors

Total 90 patients	No. of patients	%
Smokers	75	83.3%
Presence of Diabetes Mellitus	55	61.1%
Presence of hypertension	20	22.2%
Presence of hypercholesterolemia	10	11.1%
Left ventricle normal function	44	48.9%
Presence of left ventricular impairment	46	51.1%

ISR: in stent restenosis

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تحليل نتائج استخدام الشبكات الداعمة الطويلة (اكثر من 20 ملم) في الشرايين الإكليلية في علاج مرضى القلب في مركز الملكة علياء لامراض وجراحة القلب – الاردن

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خلاصة:

الهدف: معرفة نتيجة وتقييم استخدام الشبكات الداعمة الطويلة (اكثر من 20 ملم) في علاج الشرايين الإكليلية ذات التضيق الطويلة لدى المرضى الذين يعالجون في مركز الملكة علياء لامراض وجراحة القلب – الاردن.

الوسائل: اجريت الدراسة على 900 مريض خضعوا للقسطرة الإكليلية والتداخل بواسطة الشبكات الداعمة الطويلة بسبب الذبحة الصدرية خلال الفترة بين 2006 – 2011. تم متابعة المرضى بعد 6 - 8 أشهر لمعرفة نسبة حدوث تضيق في الشبكات الداعمة الطويلة وكذلك العوامل المساعدة على حصول ذلك. وقد صمم لهذا نموذجاً لتسجيل البيانات التالية: الجنس والسن، نوع وطول وقطر الشبكة الداعمة المستخدمة، وجود مرض السكري وارتفاع ضغط الدم، أو الكوليسترول، وكذلك حالة عضلة القلب.

النتائج: ظهر حدوث تضيق في الشبكات الداعمة الطويلة في 90 مريض من مجموع الحالات التي تم اعادة القسطرة القلبية لها. ويشكل الذكور الغالبية (88.9%) من المرضى. كانت اكثر العوامل المرتبطة بحدوث تلك التضيق هي التدخين (83.3%) يليه السكري (61.1%). كان الشريان الإكليلي الايسر الهابط الاكثر تأثراً بحدوث تضيق في الشبكات الداعمة الطويلة خصوصاً في الجزء الاولي (33.3%)، بينما منتصف الشريان كان الجزء الاقل اصابة. حدثت 77.8% من حالات التضيق في الشبكات الداعمة المعدنية غير المطلية. حوالي ثلثي المرضى المصابين كان قد تم علاجهم باستخدام شبكات صغيرة القطر 2.5 و 2.75 ملم.

خلاصة: يعتبر حدوث تضيق في الشبكات الاكليلية الداعمة الطويلة من المضاعفات الطبية المعروفة وغير النادرة. الرجال هم أكثر تضرراً من المرأة خصوصاً المدخنين والذين يعانون من داء السكري. ان استخدام الشبكات الداعمة الطويلة المعدنية غير المطلية صغيرة الحجم اقل من 2.75 ملم في الشريان الإكليلي الايسر الهابط خصوصاً في الجزء الاولي منه، يعتبر من اهم العوامل المرتبطة بحدوث تضيق داخل تلك الشبكات.

كلمات رئيسية: تضيق اكليلية طويلة، تضيق في الشبكات الداعمة