

Outcome Analysis of one year after an Invasive Compared with Non-Invasive Strategy in Unstable Angina

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ABSTRACT

Background: In those patients with acute coronary syndrome who have NSTEMI or unstable angina, two kinds of treatment have been generally offered, either a routine invasive strategy shortly after admission, where all patients undergo coronary angiography and revascularization where needed, or a conservative strategy where only medicines are used.

Aim: To compare clinical outcomes of patients with unstable angina after one year, in invasive and non-invasive treatment modalities.

Study Design: Cohort study design.

Setting & duration: Department of Cardiology, Mayo Hospital Lahore., One year (from 3-2-2017 to 3-2-2018).

Methods: 74 patients fulfilling selection criteria were enrolled. The patients were divided into two groups. In group A, patients were treated with invasive approach along with medication. In group B, patients were treated with medication only. Both group patients were followed-up for one year and were evaluated for survival and other outcomes.

Results: Our study shows more patients survived in the group A where interventional procedure (Coronary Angiography, followed by PCI OR CABG etc) was carried out as compared to noninvasive group where only medication were used. Mean age of study population was 52.25 (invasive: 51.59±9.03 years while non-invasive: 52.92±10.37 years). There were 28(75.7%) males and 9(24.3%) females in invasive group. There were 23(62.2%) males and 14(37.8%) females in non-invasive group. There were 35(94.6%) patients who survived in invasive group while 31 (83.8%) patients survived in non-invasive group (p-value= 0.134). Almost similar results were seen for other outcomes. 11(29.7%) patients had readmission in invasive group while 13(35.1%) patients had readmission in non-invasive group (p = 0.619).

Conclusion: The difference of mortality and other outcomes was not statistically significant in both groups (p>0.05), although the number of patients with survival and better outcomes were more in invasive group as compared to conservative group.

Keywords: Invasive, Non-invasive, Management, Unstable angina, Survival

INTRODUCTION

The clinical spectrum collectively called as acute coronary syndrome include, ST- elevation myocardial infarction (STEMI), non-ST segment elevation myocardial infarction (NSTEMI) and unstable angina;(USA). Unstable angina is defined as an ACS, where patients suffering from chronic stable angina have increasing severity of symptoms, either as increased duration of chest pain or there are more frequent attacks of ischemic chest pain or angina equivalent and there is no detectable release of cardiac markers of myocardial necrosis during such an episode of pain¹. The estimated incidence is about 0.6% among people aged 35–74 years and around 2.3% in people of 75 years of age and over. Out of the total number of patients presenting as ACS 75.4% are estimated to be unstable angina².

Currently two kind of treatment options can be used for management of patients with unstable angina either

invasive or noninvasive at the time of presentation in ER. Several studies, have been done to find out as to which treatment option is better while managing such patients³. In invasive approach coronary angiography is performed with in an index hospitalization and revascularization is offered via PCI (Percutaneous Coronary intervention, in which balloon angioplasty or stenting is done) or (CABG coronary artery bypass grafting) depending on coronary anatomy^{4,5}. In the other strategy, patients are treated with medications initially and only those who remain still symptomatic in spite of receiving optimal anti ischemic drug therapy or those who demonstrate evidence of high risk features of ischemia on different non-invasive modalities like, ETT (Exercise Tolerance Test), stress thallium, stress echocardiography or CT coronary angiography, undergo invasive procedures^{3,4,6}.

Some major clinical trials like FRISC 2, RITA -3 and TACTIS –TIMI 18, have shown better clinical outcomes with use of invasive approach and benefits in the form of reduction of fatal and nonfatal cardiovascular events extending up to five years or beyond.

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In a large cohort study of patients, in real life management, male & female had similar and good outcome associated with an invasive strategy and death rate was less in invasive i.e. 26.1% versus 59% deaths in non-invasive strategy⁴.

The objective of the study was to compare clinical outcomes in patients with unstable angina after one year in invasive and non-invasive treatment

MATERIALS AND METHODS

This cohort study design was conducted in the Department of Cardiology, Mayo Hospital, Lahore from 3 February 2017 to 3 February 2018. Non-probability convenient sampling technique was used. There were two study groups.

Group A: patients were treated with invasive approach like angioplasty / stenting and CABG.

Group B: patients were treated with non-invasive method (medication only)

Sample Size: Sample size of 74 patients (37 patients in each group) was estimated by using 5% level of significance, 90% power of test with expected percentage of unstable angina in invasive and noninvasive group as 26.1 % and 59%. (1)

Inclusion Criteria: Diagnosed patients of unstable angina, after stabilization of symptoms including recurrent angina at minimal exertion, or anginal symptoms at rest and those not fully controlled with medicines.

Exclusion Criteria: Patients with STEMI (ST elevation myocardial Infarction,) and NSTEMI (Non ST elevation myocardial infarction) cardiogenic shock, inability to give informed consent, patients with end stage renal disease and decompensated liver disease or those with life expectancy < 6 Months .

Data Collection Procedure: All data was collected after approval from board of study and ASRB of KEMU Lahore. The patients were divided into two groups after their admission in Cardiology department. Informed consent was obtained. Demographic details were noted. In group A, patients were treated with invasive approach such as Coronary angioplasty/stenting and or CABG. In group B, all patients were treated with medications only. Patients were followed up in OPD after hospital discharge. They were evaluated after completion of one year of study period. Their clinical history was recorded along with a detailed physical examination.. Outcomes were noted as mortality or morbidity in terms of re-admission, (Subsequent admission a of patient, previously discharged after being symptoms free), heart failure (patient with complaint of shortness of breath and orthopnea etc with fine bibasilar rales and third heart sound (S3) on examination. , myocardial infarction ,patient with angina or angina equivalent with ST-T changes on ECG and/or abnormal cardiac markers), intervention after initial management (patient going through invasive procedure such as coronary angiography/angioplasty or CABG after initial treatment) or refractory angina (recurrent presentation of patient with Angina in spite of conventional therapies including drugs, and coronary interventions).

Data Analysis: All data was entered and analyzed using SPSS version 20. Qualitative data like gender and Occupation, socio economic class, outcomes of previous

procedure were presented in the form of frequency (%). Quantitative data like age, BMI etc. were presented in form of Mean ± SD. Chi-square test was applied to compare the qualitative outcome in both study groups (Invasive and noninvasive group in unstable angina). P-value < 0.05 was considered as significant.

RESULTS

The mean age of patients in invasive group was 51.59±9.03years while the mean age of patients in non-invasive group was 52.92±10.37 years. There were 28(75.7%) males and 9(24.3%) females in invasive group. There were 23(62.2%) males and 14(37.8%) females in non-invasive group. The mean BMI of patients in invasive group was 26.30±5.02kg/m² while the mean BMI of patients in non-invasive group was 26.86±4.73kg/m². There were 14 (37.8%) diabetics in invasive group and 23 (62.2%) in non-invasive group.

There were 35(94.6%) patients who survived in invasive group while 31(83.8%) patients survived in non-invasive group. The difference was insignificant in both groups (p>0.05). However, more patients survived in invasive group. There were 11(29.7%) patients who had readmission in invasive group while 13 (35.1%) patients had readmission in non-invasive group. The difference was insignificant in both groups (p>0.05). There was 1 (2.7%) patient who had heart failure in invasive group while 2 (5.4%) patients had heart failure in non-invasive group. The difference was insignificant in both groups (p>0.05). There were 2 (5.4%) patients who had myocardial infarction in invasive group while 4(10.8%) patients had myocardial infarction in non-invasive group. The difference was insignificant in both groups (p>0.05). There were 4(10.8%) patients who needed intervention after initial treatment in invasive group while 5(13.5%) patients needed intervention after initial treatment in non-invasive group. The difference was insignificant in both groups (p>0.05). There were 4 (10.8%) patients who had refractory angina in invasive group while 9(24.3%) patients had refractory angina in non-invasive group. The difference was insignificant in both groups (p>0.05).

Table-1: Demographics

	Group	
	Invasive(A)	Non-invasive(B)
n	37	37
Age (years)	51.59±9.03	52.92±10.67
Male	28 (75.7%)	23 (62.2%)
Female	9 (24.3%)	14 (37.8%)
BMI (kg/m ²)	26.30±5.02	26.86±4.73
Diabetes	14 (37.8%)	23 (62.2%)

Table-2: Survival of patients in relation to type of treatment given

Outcome	Invasive (n=37)	Non-invasive (n=37)	P-value
Survival	35 (94.6%)	31 (83.8%)	0.134
Readmission	11 (29.7%)	13 (35.1%)	0.619
Heart failure	1 (2.7%)	2 (5.4%)	0.556
MI	2 (5.4%)	4 (10.8%)	0.349
Intervention	4(10.8%)	5 (13.5%)	0.722
Refractory angina	4 (10.8%)	9 (24.3%)	0.127

DISCUSSION

Two strategies have been used in managing patients with unstable angina/non-ST-elevation myocardial infarction (UA/NSTEMI). Patients may undergo an early invasive strategy of coronary angiography followed by revascularization either by way of percutaneous coronary intervention (PCI, balloon angioplasty/ stenting) or Coronary artery bypass grafting (CABG) depending on coronary anatomy, left ventricular systolic function, age and comorbidities like diabetes etc. Whereas in conservative approach patients are initially managed and stabilized on medication and later on an intervention is planned based on presence of high risk features for ongoing ischemia⁸. Clinical trials and meta analyses conducted before availability of present antiplatelet therapy and advancement in PCI techniques offered conflicting evidence to support one strategy over the other. In fact trials like VANQISH and TIMI 3B showed similar clinical outcomes like death or MI in patients undergoing either of the two treatment modalities...Studies done in mid-nineties and early in this century after development of newer and potent antiplatelet and advancement in stent technology, however have demonstrated clear superiority of early invasive approach for patients with unstable angina and NSTEMI, These include FRISC 2, RITA 3 and TACTIS TIMI 18.

Our study showed conflicting results, as the patients treated with invasive strategy had better survival and other outcomes yet were statistically insignificant as compared to the patients treated conservatively, i.e. Survival: 35 (94.6%) patients in invasive group vs. 31 (83.8%) patients in non-invasive group (**p-value**= 0.134).

Almost similar results were found for other outcomes. Readmission 11(29.7%) patients in invasive group vs. 13(35.1%) patients in non-invasive group (**p-value**= 0.619). Heart failure: 1(2.7%) patient: invasive group v.s 2(5.4%) patients: non-invasive group (**p-value**= 0.556). Myocardial infarction: 2(5.4%) patients: invasive group vs. 4(10.8%) patients: non-invasive group (**p-value**= 0.349). Intervention after initial treatment: 4 (10.8%) patients: invasive group vs. 5 (13.5%) patients: non-invasive group (**p-value**= 0.722). Refractory angina: 4(10.8%) patients: invasive group vs. 9(24.3%) patients: non-invasive group (**p-value**= 0.127).

Teixeira R findings reported that mortality was significantly different between invasive vs. conservative strategy in unstable angina patients as (0.26% vs. 3.9%; P-value < 0.05)¹⁴. Findings in our study do not clearly support or contradict data as reported in abovementioned study, although more patients survived in early invasive treatment group.

Boden study also contradicts the findings of this study as they have showed that mortality was higher in invasive group as compared to conservative strategy in unstable angina patients as (7.5% vs. 2.7%; P-value < 0.05)¹⁵. A recently published meta-analysis in 2016 supports class I recommendation of routine invasive treatment for patients diagnosed as UA¹⁷.

Results of this study are not convincing enough to support class I recommendation of routine invasive treatment for patients diagnosed as UA. Wallentin, L results supports the findings of this study to some extent as in his

study patients in the early invasive-strategy group had lower rates of combined death or MI (P = 0.005), death (P = 0.016), MI (P= 0.015), readmission at 1 year (P<0.001), and having any cardiac procedure after first admission (P < 0.001)¹⁸.

Boden et al. study demonstrated that conservative therapies could play more beneficial role in NSTEMI-ACS patients than did invasive strategy¹⁹. Ferry et al. found that Boden et al in his study excluded patients with high-risk ischemic complications (e.g., unstable angina after infarction, congestive heart failure that did not respond to medical therapy, cardiogenic shock, or symptomatic ventricular arrhythmia) during the first 48 hours after the onset of infarction. Moreover, PCIs techniques and equipment were not that well established as they are currently. With the development of modern percutaneous coronary intervention technology, invasive strategies show more benefit than conservative medical therapies in NSTEMI ACS patients²⁰.

There is no doubt whatsoever that a routine invasive strategy in men with NSTEMI ACS is indicated, as clearly shown in the FRISC II, RITA 3, and TACTICS-TIMI 18 trials^{21,22}. This study is supported by a meta-analysis by O'Donoghue et al, published in 2008 and including 8 trials (3075 women and 7057 men), showed no significant difference in outcome with a routine invasive vs a rather selective invasive strategy in the endpoint of death/MI, either for men or women.¹¹ The same results were shown in a meta-analysis presented together with data from the OASIS 5 women sub-study that included women only but did not reach the required number of patients to draw proper conclusions²³.

Although debate as to which strategy is better continues yet more and more data from recent trials and meta analyses is in favor of invasive strategy which significantly reduces the incidence of recurrent chest pain, myocardial infarction and re-hospitalization due to other reasons like heart failure and arrhythmias etc. The benefits seem to persist even up 3 to 5 years after intervention. However, the invasive strategy is associated with a doubled risk of procedure-related heart attack and increased risk of bleeding. Hence, available studies suggest that the invasive strategy may have particular benefit in patients who are at higher risk for recurrent events and that patients at low risk for a recurrent event may not derive benefit from invasive intervention²⁴.

CONCLUSION

Results of this study demonstrate that the difference of mortality and other outcomes is insignificant in both groups (p>0.05), even though the number of patients with survival and better outcomes are more in invasive group as compared to conservative group.

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