



SUCCESSFUL TREATMENT OF AN ELDERLY, FRAIL PATIENT WITH NON-ST ELEVATION MYOCARDIAL INFARCTION AND MULTI-ORGAN FAILURE: AGAINST THE ODDS

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ABSTRACT – Contemporary cardiology offers potent treatment options for acute coronary syndrome. Occasionally, the most challenging part of the patient care occurs after percutaneous coronary intervention (PCI). Complications such as acute renal failure requiring renal replacement therapy, need for mechanical ventilation, infections, septic syndrome requiring vasopressor therapy, and stroke may influence short- and long-term outcome of such patients. In this paper, we present a case of an elderly lady treated with left main PCI due to acute non-ST elevation myocardial infarction. The case was complicated with all above listed events, however, the outcome was favourable.

Key words: *left-main, percutaneous coronary intervention, mechanical ventilation, renal replacement therapy, stroke, sepsis*

Introduction

Contemporary cardiology offers potent treatment options for acute coronary syndrome. Recent advancements include wider availability of intracoronary imaging, better stent designs with improved deliverability, radial force and potential to manipulate during complex bifurcation interventions, wide range of options for calcium debulking, and more potent antiplatelet therapy. Thus, percutaneous coronary intervention (PCI) remains a viable option for left main (LM) revascularisation, particularly in frail and elderly patients (1). By

avoiding surgery, numerous postoperative complications can be avoided. However, such complications occasionally occur following PCI. Acute renal failure requiring renal replacement therapy (RRT), need for mechanical ventilation, infections, septic syndrome requiring vasopressor therapy, and stroke influence short- and long-term outcome of such patients. Here, we present a case of elderly lady treated with LM PCI due to acute non-ST elevation myocardial infarction (NSTEMI). The case was complicated with all above listed events; however, the outcome was favourable.

Case report

A 82-year-old frail (Edmonton frail scale 7) but lucid female patient with a history of diabetes, hypertension and smoking (60 packed years) was examined in the Emergency Department for nausea, abdominal

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pain and 5-day course of productive coughing. Work-up included clinical examination, laboratory analyses, abdominal ultrasound, and computed tomography (CT). A subacute phase of calculous cholecystitis, right sided lobar pneumonia, and NSTEMI were established. A conservative approach was recommended for cholecystitis, however, pneumonia and NSTEMI required hospitalisation. As coronary angiography was planned, the patient was admitted in the Cardiac Intensive Care Unit (ICU).

Upon admission, she was alert, eupnoic with 2 L/min of oxygen supplementation (oxygen saturation of 94% was measured), blood pressure was 110/75 mmHg. Rales could be heard over lower halves of the lungs, and heart auscultation was unremarkable. Sinus rhythm with 75/min and diffuse ST denivelation (2 mm) and elevation in aVR (1 mm) were recorded on electrocardiogram. Echocardiography revealed normal sized left ventricle with antero-apical scarring, reduced systolic function (ejection fraction of 40%), moderate mitral regurgitation and mild pulmonary artery hypertension. Initial high sensitivity troponin I measured 5077 ng/mL. Dual antiplatelet therapy with clopidogrel was initiated. Coronary angiography with right femoral approach revealed subtotal stenosis of shaft and ostial LM with patent bifurcation, and chronic total occlusion of

left anterior descending artery in medial segment (Figure 1). A non-dominant right coronary artery was free of stenosis. An ad hoc intervention ensued. LM stenosis was negotiated with Pilot 50 coronary wire over EBU3.5/7F guiding catheter with side holes. Multiple brief balloon dilatations were performed (semi-compliant 2.25 mm; noncompliant 2.5 mm, 3.25 mm, 4.0 mm and 4.5 mm), followed by implantation of a Synergy Megatron 5.0/12 mm drug eluting stent. Post-dilatation with noncompliant 5.0 mm balloon ensured an optimal morphological result and Thrombolysis-in-myocardial-infarction (TIMI) III flow. A total of 280 ml of contrast media was used. The access site was closed with a suture-mediated percutaneous closure system. There were no immediate peri-interventional complications related to the procedure.

Subsequent stay in Cardiac ICU was complicated as follows:

1. Worsening of chronic renal failure exacerbated on the 3rd post-PCI day with oliguria, hyperkalaemia and hypervolemia. RRT was initiated (continuous veno-venous hemodiafiltration) and maintained for 9 days in total. During this period, renal function recovered with adequate daily diuresis and potassium elimination. No additional episodes of RRT were needed.

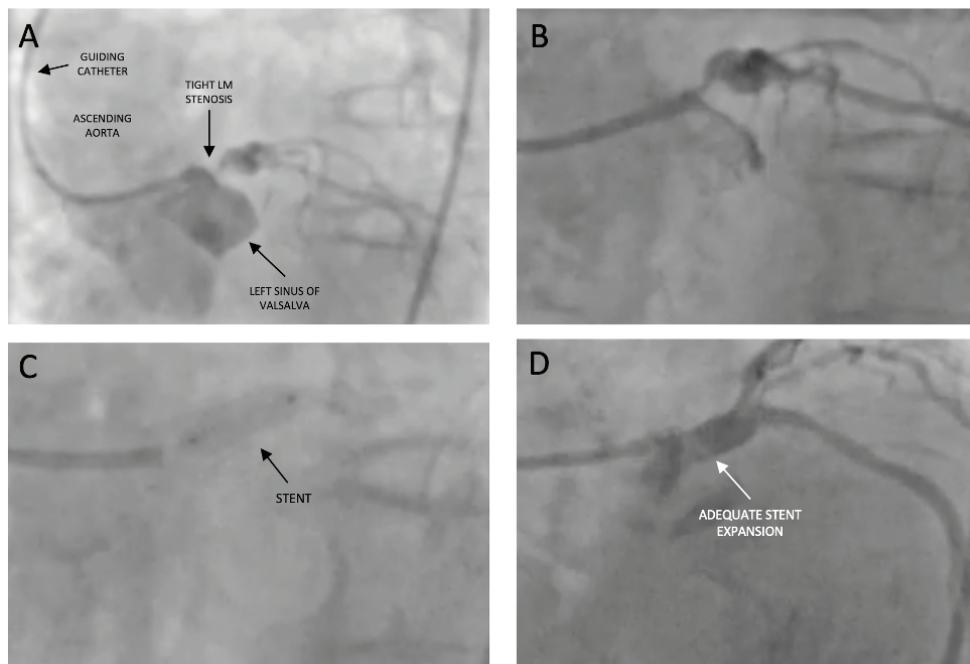


Figure 1. Panel A – tight left main (LM) stenosis. Panel B – small improvement after first balloon dilatation. Panel C – stent delivery. Panel D – final result depicting adequate stent expansion.

2. An acute hypoxemic non-hypercapnic respiratory failure ensued. The patient was intubated on the 2nd post-PCI day, mechanically ventilated, initially with the modes supporting spontaneous triggering (pressure support). However, on the 3rd day of mechanical ventilation, rapid shallow breathing pattern was observed, with the respiratory rate reaching 45/min and the rapid shallow breathing index of 180 breaths/min/L. Sedation (midazolam) and analgesia (sufentanyl) doses were escalated, and the bi-level ventilation with 10 full cycles/min (I:E=1:1), positive end-expiratory pressure of 10 cm H₂O, P_{high} of 20 cm H₂O were maintained until recovery (6 days). This ensured protective levels of tidal volumes, adequate oxygenation, and avoidance of hypercapnia. Percutaneous dilational tracheostomy was performed on the 9th day of mechanical ventilation. A total of 27 days of mechanical ventilation was needed prior to successful weaning. Four days later, tracheostomy was successfully removed.
3. Right-sided lobar pneumonia progressed to multilobar pneumonia. Multiple daily bronchial hygiene events via flexible bronchoscopy were performed. Initial antibiotic therapy with ceftriaxone and metronidazole (for cholecystitis) was upgraded to meropenem and vancomycin. Blood cultures and bronchial aspirates revealed *Klebsiella pneumoniae* (susceptible to colistin, ceftazidime with avibactam) as a causative agent, thus treatment was changed to ceftazidime with avibactam, with subsequent addition of fosfomycin due to poor clinical effect. A progression towards septic shock occurred, with the need for noradrenalin (up to 1.5 mcg/kg/min) and vasopressin (up to 0.04 units/min). A total of 11 days of vasopressor therapy was needed. Inotropes were not administered. Since the 5th post-PCI day ejection fraction of left ventricle improved to 45%.
4. On the 15th post-PCI day patient became unresponsive with a fixed gaze towards left. Spontaneous breathing was maintained. Head CT revealed acute ischemic stroke of the right frontal cortex. Five days prior to the event patient, was treated with amiodarone for paroxysmal atrial fibrillation, which recurred the following day but was eventually successfully converted to a stable sinus rhythm. Low-molecular weight heparin was given throughout the whole treatment period;

however, the dose was adjusted to accommodate the level of renal insufficiency and the needs of RRT. No additional therapy for stroke was administered (triple antithrombotic therapy was already ongoing). Since the 18th post-PCI day, the patient regained consciousness and was able to communicate non-verbally (still intubated). A complete neurological recovery ensued.

5. Rehabilitation was performed throughout the treatment. Regular contacts and visits by the family members were assured. Enteral feeding was maintained via nasogastric tube until tracheal decannulation, and later oral feeding was reinstated. Peristalsis was not interrupted.

After 31 days of Cardiac ICU stay, the patient was transferred to a ward. After 9 days, she was discharged to a hospice. She was prescribed with apixaban 2.5 mg bid, clopidogrel 75 mg, amiodaron, perindopril, bisoprolol, furosemide, atorvastatin, pantoprazole and insulin scheme.

At 3-month follow-up, she was bed bound, but remained lucid, and in need of help for feeding and hygiene. She returned to her home where she was given a proper social support and physical rehabilitation.

Discussion

Short- and long-term outcomes of patients with acute coronary syndrome improved significantly in recent decades. These outcomes are profoundly dependent on age and comorbidity. In Table 1, we enumerated the risks related to the complications described in the case presented here. Adding all the listed risks (14.09) and multiplying the sum with extrapolated 1-month mortality of octogenarians with NSTEMI (7), we reached a prediction of 126% likelihood of 1-month mortality. This number is related to the above-described events only. Other high-risk features such as diabetes, LM PCI, multiple infection sites (cholecystitis not included), recurring coronary artery disease, and prolonged mechanical ventilation were omitted. Except for stroke, which is in the setting of atrial fibrillation often substantially debilitating, all other encountered complications were potentially reversible, and thus a non-withholding strategy was conducted. Despite, or “against the odds” the patient recovered well and is currently at home with acceptable physical status and exceptional cognitive condition.

In determining acceptable goals and tailoring of medical strategies, numerous variables need to be ex-

Table 1. Relative risk for 1-month mortality per complication.

Comorbidity	Relative risk ratio for 1-month mortality
Stroke (2)	3,01
Sepsis (3)	1,79
Need for mechanical ventilation (4)	3,07
Atrial fibrillation (5)	1,69
Acute renal failure (5)	2,54
Use of two vasopressors for sepsis control (6)	1,96
Sum of relative risks	14,06
1-month mortality for octogenarians with acute non-ST elevation myocardial infarction (7)	9%

amined. Frailty indexes are especially useful in elderly patients. Nevertheless, lifesaving procedures, such as coronary angiography with PCI of large proximal segments should be endorsed. Such procedures, if performed in early stages of the treatment, can provide crucial advantages if further complications occur. Indeed, we believe that the outcome of the patient described here would have been fatal if the LM PCI had not been performed in the early stages of the disease.

Occasionally, in the setting of ICU treatment, life threatening complications occur despite all bundles of care (infection control, protective ventilation, systemic embolism prevention, chronic renal failure monitoring). Meticulous monitoring and timely treatment of these events provide patients with vital prospects for recovery.

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Sažetak

USPJEŠNO LIJEČENJE STARIJE BOLESNICE S INFARKTOM MIOKARDA BEZ ST ELEVACIJE I MULTIPLIM ZATAJENJEM ORGANA: UNATOČ IZGLEDIMA

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Moderna kardiologija pruža velike mogućnosti zbrinjavanja bolesnika s akutnim koronarnim sindromima. U pojedinim slučajevima najzahtjevniji dio skrbi za bolesnika slijedi nakon perkutane koronarne intervencije. Komplikacije kao što su akutno bubrežno zatajenje s potrebom za nadomještanjem bubrežne funkcije, potreba za strojnim prodisavanjem, infekcije, sepsa s potrebom za potporom vazopresorima, moždani udar, znatno utječu na kratkoročni i dugoročni ishod bolesnika. U ovom prikazu referiramo bolesnicu visoke životne dobi s intervencijom na deblu lijeve koronarne arterije u sklopu akutnog infarkta bez ST elevacije, svim navedenim komplikacijama i povoljnim ishodom.

Ključne riječi: debla lijeve koronarne arterije, perkutana koronarna intervencija, strojno prodisavanje, hemodijaliza, moždani udar, sepsa