Integrating Intensive Monitoring and Telemedicine for Managing Complex Comorbidities in an Elderly Patient: A Case Study

Michael Shen | Armando Landeros | Winston Guevara

Armando Landeros, MD, BSC
alanderos@novolinkhealth.com

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Patient Background

Patient Overview:

Name: Mrs. SA, 85-year-old female

Comorbidities	
Chronic Heart Failure	Diabetes Mellitus
Coronary Artery Disease	Hypertension
Atrial Fibrillation	Peripheral Artery Disease
Cardiomyopathy	COPD
Chronic Renal Failure	Recurrent UTIs

Recent History upon initial enrollment [02/2022 to 05/2022]:

- ☐ Complications from transcatheter aortic valve replacement (TAVR) with aortic rupture that required emergency complex surgeries
  - ☐ POST-OP bed restricted with severe wound infection
  - ☐ Severe CHF, ARF, UTI/bleeding with Foley, Continuous Oxygen 24/7, Unstable

This patient presents with a complex medical history and a wide range of comorbidities, requiring a comprehensive and coordinated approach to manage her care.

Clinical Findings and Monitoring Approach

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Daily Vital Signs Tracking

Continuous monitoring of blood pressure, heart rate, oxygen saturation, and weight to detect early signs of deterioration.

Continuous EKG Monitoring

Providing immediate attention to abnormal heart rhythms and addressing chest pain complaints.

Home-based Lab Tests

Regular urine cultures, blood glucose monitoring, kidney function tests (creatinine levels), and ProBNP for CHF management.

Telemedicine Consultations

Multidisciplinary team of cardiologists, urologists, and nephrologists providing virtual visits for proactive care.

Medication Adjustments

Real-time adjustment of medications (e.g., Coreg, Bumex, antibiotics) based on daily health metrics.

Symptom Reporting and Immediate Interventions

Addressing patient-reported symptoms like shortness of breath, tachycardia, and anxiety promptly to avoid hospital admissions.

Upon enrollment, Mrs. SA was bed-restricted and unstable.

- ❑ Within the first two months, she was stabilized and discharged from the program.

Key Interventions

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01 Cardiac Monitoring

- ❑ EKGs conducted regularly for AF and CHF management.
- ❑ Medication adjustments based on ProBNP levels.

02 Infections and Renal Management

- ❑ Urosepsis and UTIs managed through home-based lab tests and IV antibiotic treatments.
- ❑ Renal function normalized and evidenced by monitoring creatinine levels.

However, she was readmitted twice within 6-8 weeks for urosepsis and CHF exacerbation with rapid AF and infection, [4 days per hospitalization] leading to her re-enrollment [7/16/2022]

Throughout the program, she underwent multiple interventions, including:

- ❑ Renal stone management
- ❑ Toe amputations
- ❑ Peripheral stenting of the femoral artery

The care team, including multi-specialisty physicians, nurse practitioners, medical assistants, and a telemedicine support team, provided continuous monitoring and prompt interventions.

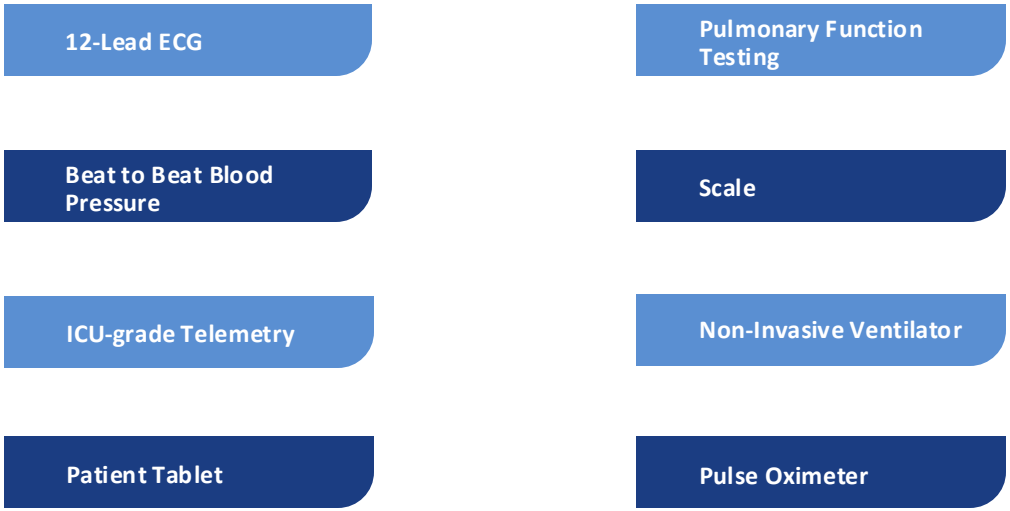
- ❑ Mrs. SA experienced multiple after-hours tachycardia/anxiety events, which were managed effectively, preventing hospital admissions.

Prevented Hospitalizations

Date	Symptoms	Intervention
3/27/2024	Tachycardia, HR 139	Coreg 3.125 mg, monitor heart rate and blood pressure
3/4/2024	Anxiety and Tachycardia, HR 146, BP 107/84	Coreg 3.125 mg, BP and HR improved, continous monitoring
2/29/2024	Tachycardia of 140 with A-fib	Coreg additional dose administered
1/1/2024	Weight gain on IV antibiotics for urosepsis	Bumex 2 mg PO, monitor weight
9/25/2023	Shortness of breath, anxiety, POx 90%	.5 Bumex, 2L oxygen, continous monitoring
9/11/2023	Stomach cramps, bloating, 10/10 pain	Stop Levaquin, start Septra DS, comfort food
8/23/2023	Anxiety and Tachycardia, HR 138	Coreg 3.125 mg, supplemental oxygen, continous monitoring
7/10/2023	Hypoglycemia (69 mg/dL)	Glucose tablets, endocrinology assessment
6/15/2023	Patient took extra dose of Coreg --> Hypotension	Hydration, BP monitoring
12/16/2022	Tachycardia, A-fib rapid rate	Beta blocker, rate control achieved
11/28/2022	Malaise, palpitations, HR 150	Coreg administered, stabilized in 25 minutes
10/12/2022	Tachycardia, HR 152	Coreg administered, normalized in 30 minutes
10/4/2022	Tachycardia, HR 128, BP 143/68, Rapid A-fib	Carvedilol 6.25 mg, oxygen, HR normalized
8/25/2022	UTI with severe leukocytosis	IV antibiotics, CHF/CKD management
8/16/2022	Nausea and vomiting	Regran prescribed, no hospitalization required

Operational Improvements and Technology Integration

- Home-based lab tests and telemedicine allowed faster decision-making.
- Real-time monitoring and multidisciplinary care ensured prompt interventions.
- National guideline-aligned care approach for remote management.



Outcomes and Prevented Hospitalizations

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- **Reduction of Hospital Readmissions:**

  Through continuous remote monitoring and timely interventions, the patient avoided 15 hospitalizations during her care period [July 16, 2022, to March 28, 2024].

  This proactive management included monitoring heart rate, oxygen saturation, and fluid retention, preventing further episodes of decompensation related to CHF and A-fib.

- **Stabilization of CHF and Renal Function:**

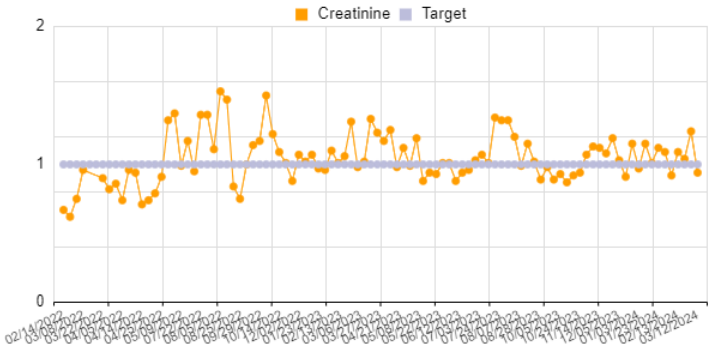
  Consistent monitoring of vital signs, along with tailored medication adjustments, resulted in stabilized CHF and normalized renal function, preventing acute exacerbations that would otherwise have led to emergency care.

- **Successful Management of Acute Infections:**

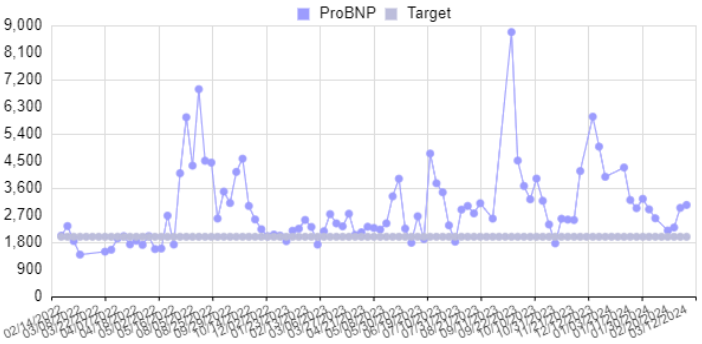
  Urosepsis and urinary tract infections, significant contributors to the patient's previous hospital admissions, were managed with timely antibiotic therapy.

Detailed Analysis of Improvements

Renal Function	
Initial Condition	→ Chronic kidney disease (CKD) with episodes of acute renal failure (ARF) due to recurrent infections and fluid retention.
Improvements	❑ Normalization of creatinine levels through daily monitoring and timely adjustments of medications. ❑ Avoided further acute kidney injury (AKI) by addressing infections early and managing fluid balance effectively.

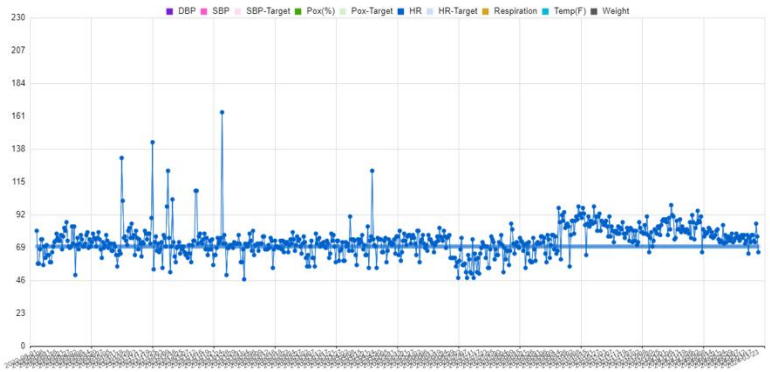


Congestive Heart Failure	
Initial Condition	→ Frequent exacerbations of CHF w/ weight gain, fluid overload, and SOB. → High levels of ProBNP
Improvements	❑ Stabilized CHF through real-time adjustments of heart failure medications. ❑ Reduction in ProBNP levels ❑ Prevented hospitalizations by using home-based interventions.

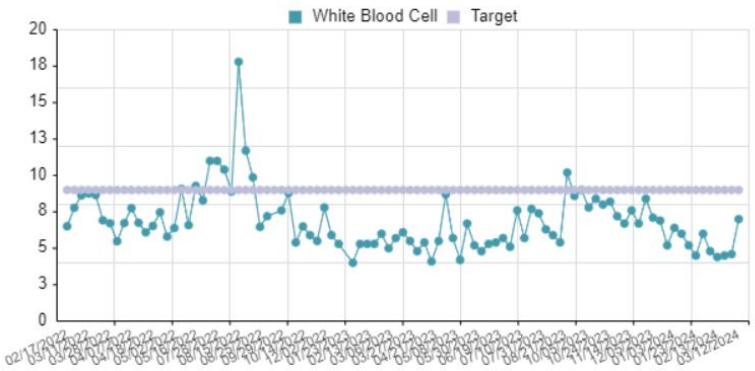


Detailed Analysis of Improvements

Atrial Fibrillation and Tachycardia	
Initial Condition	→ Persistent episodes of tachycardia and rapid atrial fibrillation leading to ER visits
Improvements	❑ Regular EKG monitoring allowed for early detection and management of AF episodes. ❑ Medication adjustments promptly addressed rapid heart rates ❑ Over time, fewer tachycardia episodes were recorded, and heart rate control improved.



Infection Management	
Initial Condition	→ Recurrent urinary tract infections (UTIs) and episodes of urosepsis
Improvements	❑ Early diagnosis and early treatment of infections using IV antibiotics. ❑ Regular lab tests, reduced the severity of infections and prevented systemic complications.



Impact of the Program

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Significant Reduction in Acute Care Utilization:

- ❑ Leveraged remote monitoring to avoid hospital admissions by providing early interventions for acute exacerbations.

Enhanced Chronic Disease Management:

- ❑ Improved stability in chronic conditions, reducing the severity and frequency of acute episodes that typically required hospital-based care.

Empowered Patient-Centered Care:

- ❑ Telemedicine empowered the patient to manage their condition at home, fostering independence and reducing the strain of frequent in-person visits.

High Patient and Family Engagement:

- ❑ The program improved the patient and family's involvement in decision-making, contributing to increased satisfaction with care and confidence in managing health issues at home.

Model for Sustainable Healthcare Delivery:

- ❑ The program's use of technology and multidisciplinary coordination presents a scalable and cost-effective model for managing complex comorbidities in the aging population.

The holistic approach of combining medical care with mental health support was effective in improving the patient's overall well-being and stability.

Conclusion

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Holistic Management of Complex Comorbidities:

This case-study demonstrated that a multi-faceted, patient-centered approach can effectively address complex medical needs

Preventing Crises through Continuous Care:

By leveraging continuous monitoring and real-time adjustments, the program minimized emergency situations, proving that proactive care can significantly reduce acute events.

Shifting the Paradigm of Elderly Care:

This case study exemplifies the potential to shift from reactive, hospital-based care to preventive, home-based management, setting a new standard for managing elderly patients with chronic conditions.

Long-Term Impact:

The success of this approach suggests that telemedicine and remote monitoring can provide lasting benefits, not just by preventing admissions, but by offering a more sustainable and patient-friendly model for care.

The program successfully managed Mrs. SA's complex comorbidities, reduced hospital readmissions, and improved her overall quality of life. These strategies can be adopted by other healthcare programs to achieve similar outcomes in managing elderly patients with multiple chronic conditions.