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IMPACT OF ANTICOAGULATION VIRTUAL MONITORING ON CLINICAL OUTCOMES FOR ADULTS ON WARFARIN: A RETROSPECTIVE COHORT STUDY

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BACKGROUND

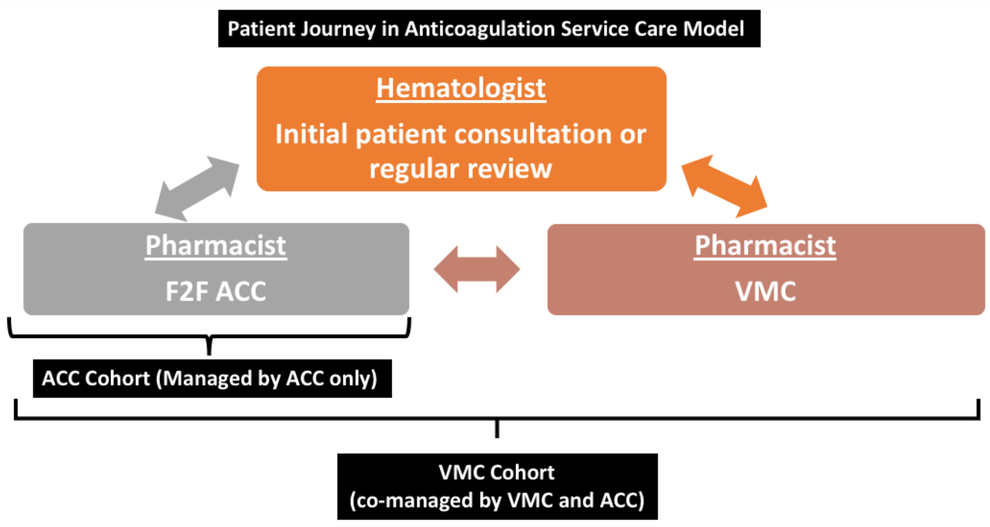
To improve care efficiency, pharmacists offered virtual clinics, via telephone consultations to manage adults on warfarin. We sought to find out if care provided by VMC was as safe and effective as the usual care provided by ACC, among stable adults on warfarin.

AIM

To evaluate outcomes of adults on warfarin co-managed with virtual monitoring clinic (VMC) compared to adults managed by physical anticoagulation clinic (ACC)

METHODS

A single centred retrospective cohort study conducted in Singapore General Hospital. Adults on warfarin referred by hematologist to ACC were included. Eligible adults were transferred to VMC based on specific criteria. The ACC cohort consisted of adults seen physically (F2F) in clinic and VMC cohort were adults co-managed with physical and virtual clinics. Patient demographics and clinical characteristics were extracted electronically between 1 January 2019 to 31 May 2020. Percentage time in therapeutic range (%TTR) was calculated using Rosendaal method. Qualitative feedback was collected from the VMC cohort using a questionnaire survey via phone.



Selection Criteria for VMC

- ✓Stable medical condition
- ✓On long term warfarin
- ✓INR stable for 3 months
- ✓No recent bleeding or thrombotic events
- ✓Capacity to manage therapy and return if bleeding or thrombotic complications
- ✓Contactable and understands verbal instructions

STATISTICAL ANALYSIS

Student t-test and chi-square test was used to assess differences in continuous and categorical variables respectively between the ACC and VMC cohorts. Fischer exact test was used to assess differences in bleeding and thrombosis between the 2 cohorts.

RESULTS

A total of 546 adults were analysed which consisted of 151 (28%) and 395 (72%) from the VMC and ACC cohorts respectively. The %TTR for VMC cohort was 68% which was significantly higher compared to ACC at 62% (p= 0.03) (Table 1). There were no significant difference in bleeding or thrombotic rates between the 2 cohorts (p= 0.74) (Table 2) . Feedback for VMC was positive for reducing waiting time and work absenteeism (Table 3).

Table 1. Patient Demographics, Indication for Warfarin and %TTR

Patient Clinical Characteristics	Total n (%)	ACC n (%)	VMC n (%)	*P*
	546	395 (72.3)	151 (27.7)	0.04
Age (mean years ± SD)	64 (±15)	65 (±16)	61 (±15)	
Gender				
Female	279 (51.1)	202 (51.1)	77 (51.0)	NS
Male	267 (48.9)	193 (48.9)	74 (49.0)	
Race				
Chinese	379 (69.4)	267 (67.6)	112 (74.2)	NS
Malay	98 (17.9)	78 (19.7)	20 (13.2)	
Indian	50 (9.2)	36 (9.1)	14 (9.3)	
Others	19 (3.5)	14 (3.5)	5 (3.3)	
Indication for Warfarin				
Deep Vein Thrombosis or Pulmonary Embolism	328 (60.1)	242 (61.3)	86 (57.0)	NS
Other Sites of Thrombosis	94 (17.2)	69 (17.5)	25 (16.6)	
Atrial Fibrillation	64 (11.7)	48 (12.2)	16 (10.6)	
Antiphospholipid Syndrome	28 (5.1)	17 (4.3)	11 (7.3)	
Prosthetic Valve Replacement	20 (3.7)	12 (3.0)	8 (5.3)	
Hereditary Conditions	7 (1.3)	4 (1.0)	3 (2.0)	
Peripheral Vascular Disease	5 (0.9)	3 (0.8)	2 (1.3)	
Median TTR (IQR)	65 (40,84)	62 (38,82)	68 (46,89)	0.03

Table 2. Patients with Bleeding or Thrombotic Complications

Bleeding or Thrombotic Events	Total n (%)	ACC n (%)	VMC n (%)	*P*
Emergency visits or hospitalisation for bleeding or thrombosis	17 (3.1)	11 (2.0)	6 (1.1)	0.74
Minor bleeding	9 (1.6)	6 (1.1)	3 (0.5)	0.71
Major bleeding[1]	4 (0.7)	3 (0.5)	1 (0.2)	1.00
Thrombosis	4 (0.7)	2 (0.4)	2 (0.4)	0.31

Table 3. Qualitative Feedback

Questions	Qualitative Responses
Do you like the VMC service? If so, why? If not, why?	*saves a lot of waiting, can go home after blood test, not keen on spending too much time at hospital during this COVID period* *save time, don't need queue* *Save on parking fees*
Do you prefer VMC or ACC? If so why?	*Prefer VMC* *2 – 3 hours of waiting time at clinic and pharmacy is saved* *Prefer VMC. Undecided if MDS is no longer free*
Suggestions for improving VMC services?	*INR blood test form not sent, got turned away and additional waiting time to print another INR form*

CONCLUSION

There were no differences in bleeding and thrombotic rates between VMC and ACC cohorts.

Virtual monitoring via telephone consultations offered a safe and effective care model for anticoagulation management for select adults on warfarin.

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