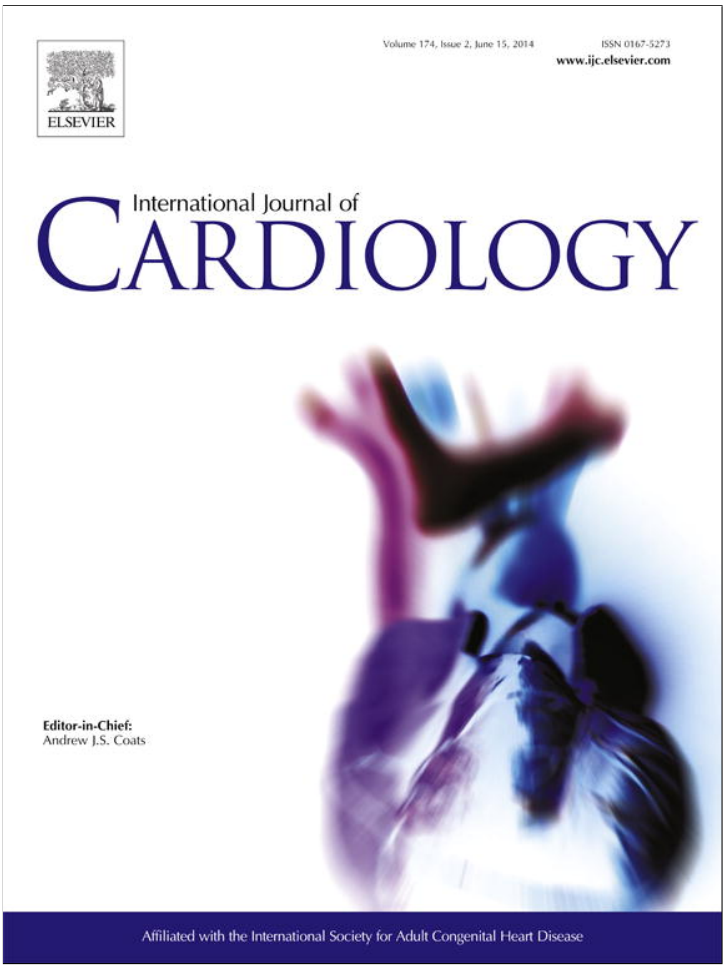

Multi-disciplinary clinic: Next step in "Heart team" approach for TAVI

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Transcatheter Aortic Valve Implantation (TAVI) is widely accepted as the treatment of choice in patients with severe aortic stenosis who are non-operable and those with intermediate to high surgical risk [1–3]. The "heart-team" approach has been central to the decision-making process in these patients. This has recently been implemented into the European and American guidelines on the treatment of valvular disease [4,5]. Thus far, the "heart team" approach has involved the discussion of patients in a multi-disciplinary team meeting (MDM) involving interventional cardiologists, imaging specialists, cardiac surgeons, cardiac anaesthetists and elderly care physicians. The disadvantage of this approach is that these patients have usually been reviewed by a single specialist working in an outpatient or office setting. We have developed a unique model of a multi-disciplinary clinic (MDC) at our hospital running twice a month, for assessing patients for possible TAVI; in this model, the patients are reviewed concurrently by an interventional cardiologist, cardiac surgeon and cardiac anaesthetist in a joint clinic. We report the first 8 months data of patients reviewed in this clinic and the outcomes, and compared this with the outcomes from the TAVI MDM conducted during the 8 months period prior to the inception of this clinic. For those who attended the clinic more than once, the decision (to accept or turn down) made during the first visit was included for analysis. "TAVI work-up" includes a combination of investigations such as Transthoracic and Trans-oesophageal echocardiography, invasive coronary angiography and femoral angiography, lung function test, blood tests (full blood count, renal function test and liver function test), carotid Doppler and CT aortogram. Patients are usually admitted in the hospital for 2–3 days to undergo these tests.

During the study period, 64 appointment slots were made in the clinic. Forty-eight patients (mean age 83 ± 6 years, 22 female) were reviewed in the clinic 57 times (7 patients seen twice, one seen three times). Out of these 48 patients, 37 (77.1%) were referred by non-local cardiologists and 11 (22.9%) were referred by local clinicians (cardiologists and cardiac surgeons). For those patients who attended the clinic, the median time interval from referral to the date of clinic was 71 (IQR 52–118) days.

During the preceding 8 months, 71 patients (mean age 81 ± 7 years, 34 female) were discussed at the MDM. There were no differences in the baseline characteristics between the two groups (Table 1). The outcome of clinic decisions for these patients is shown in Fig. 1. This was compared with the outcome for patients discussed in the MDM preceding 8 months (Fig. 2 and Table 2). A total of 13 patients in the MDC group and 28 patients in the MDM group finally underwent TAVI. In those who finally underwent TAVI, the time interval between clinic/discussion to TAVI was shorter in the MDC group when compared to the MDM group (median 54, IQR 36–88 days vs 130, 64–171 days, p = 0.01). The TAVI 'turn-down' rate was also higher when patients were reviewed in MDC when compared to MDM discussion (35.4% vs 16.9%, p = 0.03).

Table 1
Baseline characteristics of patients.

	MDM clinic n = 48 (%)	MDM discussion n = 71 (%)	p value
Age (mean ± SD)	83 ± 6	81 ± 7	0.3
Female, n (%)	22 (45.8)	34 (5.6)	0.9
Logistic euroscore (median, IQR)	25 (18.5–33)	25 (15.5–31)	0.6
CKD (eGFR < 60), n (%)	32 (66.7)	48 (67.6)	1.0
Lung disease, n (%)	16 (33.3)	25 (35.2)	0.9
LV impairment, n (%) (EF < 40%)	18 (37.5)	30 (42.3)	0.7
CVA, n (%)	5 (10.4)	12 (16.9)	0.4
PVD, n (%)	13 (27.1)	22 (31)	0.7

GFR — glomerular filtration rate, CVA — cerebrovascular accident, PVD — peripheral vascular disease.

This is the first report of a live "Heart team" clinic from a single centre in United Kingdom. The multi-disciplinary team approach is an essential component of decision-making in patients with complex conditions, particularly those being considered for TAVI. The management of these patients is challenging and the MDM plays a crucial role. Most of the clinicians involved in these MDM discussions have not met the patient themselves, particularly if they have been referred from external sources. In many cases, further information is required before making a final decision, introducing further delay into the system. In some cases, once the decision has been made at MDM, particularly if this is negative, the patient and family often, understandably, want further discussion and explanation, all of which engenders further delay and involves the use of additional resource. Clearly, having the patient present at the time of MDM discussion is not practical.

From this study, we have shown that the MDC approach leads to a significant reduction in the patient journey. Rather than multiple appointments and unnecessary additional 'TAVI-workup' investigations, patients were given a clear, unified decision after (for the most part) a single clinic appointment. It is interesting to note that the TAVI turn-down rate was significantly higher in the MDC cohort compared to the conventional MDT (despite no difference in the logistic euroscore), thereby avoiding unnecessary cost of subsequent TAVI work-up. This reflects, at least partly, the complexity of the patients referred to the MDC clinic, many of whom had a considerable burden of comorbidity. This is also beneficial for the patients, since otherwise they have to undergo investigations that may be unnecessary and also carry inherent risk, particularly in this population. Also, this approach avoids multiple trips to hospital and days of stay in hospital. In the current financial climate, these potentially cost-saving measures may be important. We have also shown that once the decision to perform TAVI has been made within the MDC, the time interval from acceptance to procedure is much shorter when compared to the standard MDM process. This is despite the fact that more patients in MDM group had completed TAVI work-up investigations prior to the discussion compared to the MDC group.

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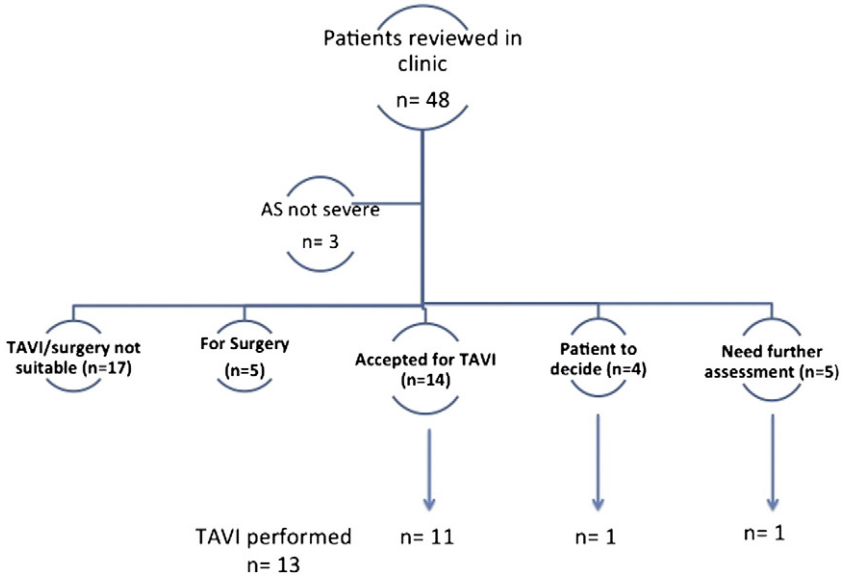

Fig. 1. Flow-chart showing the decision outcome in patients seen in the multi-disciplinary clinic (MDC).

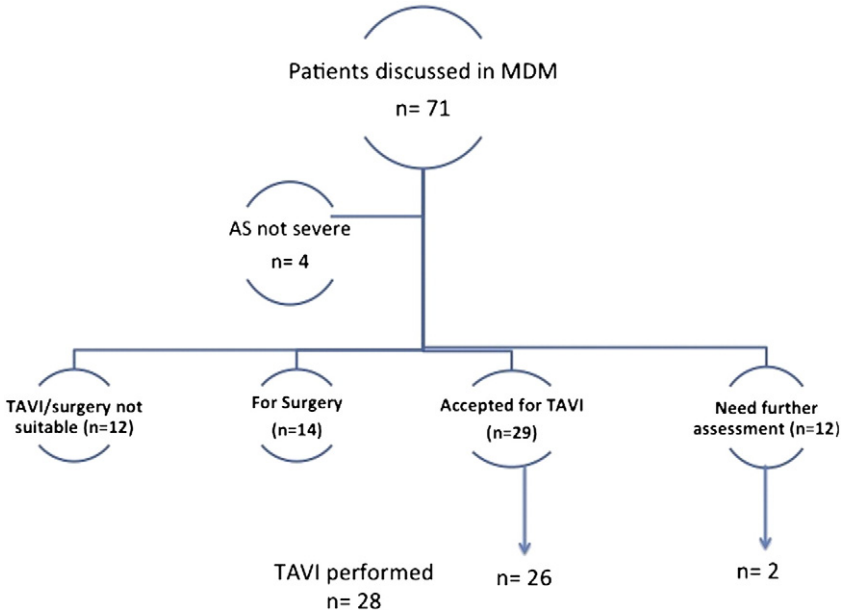

Fig. 2. Flow-chart showing the decision outcome for patients discussed at the multi-disciplinary meeting (MDM).

Table 2
Differences in decision outcome for patients in MDM and MDC group.

n (%)	MDM clinic (n = 48)	MDM discussion (n = 71)	p value
TAVI work-up completed prior to clinic/discussion	15 (31)	62 (87.3)	<0.0001
AS not severe	3 (6.3)	4 (5.6)	1.0
TAVI declined/not suitable	17 (35.4)	12 (16.9)	0.03
For surgical AVR	5 (10.4)	14 (19.7)	0.2
Accepted (provisionally, for those without work-up)	14 (29.2)	29 (40.8)	0.2
Need further assessment	5 (10.4)	12 (16.9)	0.4
TAVI performed	13 (27.1)	28 (39.4)	0.2

Multi-disciplinary clinics have been established for other medical conditions and previous reports from these clinics have been published [6–8]. These clinics are mostly run by a doctor in the presence of other healthcare professionals, such as podiatrists, and anti-coagulation nurse. In contrast, our TAVI multi-disciplinary clinics are run by a team of doctors along with a specialist TAVI nurse.

In conclusion, the use of a specialist TAVI MDC significantly reduced the time taken for a decision in this complex cohort of patients. The TAVI turn-down rate was higher. Patients underwent TAVI quicker when seen and accepted in the MDC. This model offers the potential for a more effective method of multidisciplinary assessment, but may require significant resource allocation.

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Hypertension and elevated C-reactive protein: Future risk of ischemic stroke in a prospective cohort study among inner Mongolians in China

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Hypertension and C-reactive protein (CRP) have been investigated extensively in regard to risk of stroke and cardiovascular disease in population. However, few studies have paid an attention to the cumulative effect of hypertension and CRP on the development of ischemic stroke, and there are no published studies regarding cumulative effect of hypertension and CRP on the ischemic stroke incidence in an Inner Mongolian population. The purpose of present study is to assess the association between hypertension, CRP and the future risk of ischemic stroke, and the potential role of CRP to enhance risk prediction of ischemic stroke events based on the hypertensive status in a prospective cohort study among Inner Mongolians, in China.

This prospective cohort study was conducted from 2003 to 2012 in Inner Mongolia, an autonomous region in north China. Study participants aged 20 years and older were recruited from 32 villages in two adjacent townships located in Kezuohou Banner (county) and Naiman Banner (county) in Inner Mongolia. Trained staff interviewed the participants. A total of 2589 individuals were included in this study. Ischemic stroke incidence during the follow-up period is the primary study outcome. Written informed consent was obtained for all study participants. This study was approved by the ethics committee at Soochow University in China.

Data were analyzed using SAS version 9.2. Normotension was defined as SBP < 140 mm Hg and DBP < 90 mm Hg, and hypertension was defined as SBP ≥ 140 mm Hg or DBP ≥ 90 mm Hg. Participants were divided into four subgroups: normotensives with low CRP [log CRP ≤ 1.06 mg/L (low quartile)], normotensives with high CRP [log CRP > 1.06 mg/L (upper quartile)], hypertensives with low CRP, hypertensives with high CRP. The Kaplan–Meier curves were used to estimate the cumulative incidence of events between the four subgroups and compared by log-rank test. Multivariate Cox proportional hazard models were used to determine the hazard ratios (HRs) of ischemic stroke associated with hypertension and high CRP respectively, and HRs of ischemic stroke across the four subgroups, adjusting for age, sex, family history of hypertension, body mass index, smoking, drinking, lipids, and presence of diabetes. We set a multiplicative interaction term of hypertension and CRP in Cox proportional hazards model and

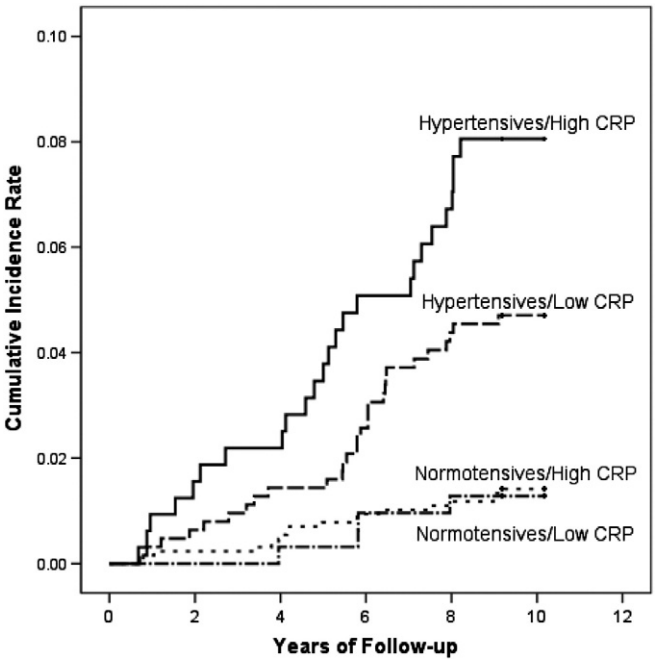

Fig. 1. Cumulative incidence curve of ischemic stroke according to hypertensive status/CRP level.

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