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Clinical Group

Archives of Renal Diseases and Management

ISSN: 2455-5495 DOI CC By

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Dates: Received: 30 March, 2017; **Accepted:** 30 May, 2017; **Published:** 01 June, 2017

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Keywords: Language barrier; Kidney transplantation; Minority ethnic; Outcomes; Health services

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Research Article

Use of Interpreters for non-native English speaking Kidney Allograft Recipients and outcomes after Kidney Transplantation

Abstract

Background: Language barriers are associated with worse health outcomes in the general population but data in kidney transplantation is lacking. This study tested the hypothesis that non-native English speakers using interpreters have poorer outcomes after kidney transplantation compared to native English speakers.

Methods: A single-center retrospective study analyzing all kidney allograft recipients transplanted between 2007-2015, with data linkage between various electronic patient records to create a comprehensive database.

Results: Data was extracted for 1,140 patients, with median follow up 4.4 years' post-transplantation. Ethnicity breakdown was; Caucasian (72.1%), black (5.5%), south Asian (17.6%) and other (4.7%). Interpreters had been requested for 40 kidney allograft recipients, with the commonest language required being Urdu/Punjabi (n=25). Patients requiring interpreting services were more likely to be of south Asian ethnicity (80.0% of users versus 15.4% of non-users, p<0.001) and female (60.0% of users versus 39.5% of non-users, p=0.008). Recipients using versus not using interpreters had less kidney allograft rejection (2.5% versus 14.8% respectively, p=0.014). There was no difference between groups for development of post-transplant diabetes, cardiac events, cerebrovascular accidents, and cancer or patient/graft survival.

Conclusion: Kidney allograft recipients with poor English skills who require interpreting services do not suffer adverse patient or kidney allograft outcomes.

Introduction

Sociocultural factors are important confounders to our understanding of outcomes after kidney transplantation, but remains a poorly understood area. One important factor which has never been discussed in the transplant literature is the influence of language barriers to clinical outcomes after transplantation, although a significant volume of literature has reported upon linguistic barriers to access to transplantation (predominantly in the United States) [1-3]. While in the general population poor language proficiency has been linked to adverse health outcomes compared [4], no similar evidence exists in the post kidney transplantation literature. This is important as 8% of the population in England and Wales profess English not to be their main language, although 79% of those surveyed in the most recent Census report stated they could speak English 'well' or 'very well' [5]. While the commonest main language (outside English or Welsh) was Polish (1.0%), this was followed by Punjabi (0.5%), Urdu (0.5%), Bengali (0.4%) and Gujarati (0.4%), reflecting the more traditional minority ethnic demographics of the United Kingdom.

It is unclear whether language barriers after kidney transplantation lead to inferior clinical outcomes. Patient-reported outcomes are increasingly being acknowledged as an important component of clinical practice with strong links to hard clinical outcomes. For example, a systematic review of 27 community-based studies demonstrated global self-reported health was an independent risk factor for mortality [6]. In addition, patient reported health-related quality of life has also been reported as being a predictor of mortality following coronary artery bypass graft surgery [7]. Lack of language proficiency will render these aspects of care redundant without adequate interpreter services. While there are concerns regarding the validity of both familial interpreters and professional interpreters, the latter frequently employed

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by healthcare providers at their expense, it is unclear whether their use attenuates risk for adverse outcomes. In the context of transplantation, it is imperative to ensure meaningful communication can be facilitated with kidney allograft recipients to reinforce compliance, enquire about side effects from immunosuppression and to enquire about general well-being. This may not be easily undertaken with patients who cannot speak English. The inability to communicate directly and fluently with patients may lead to inferior clinical outcomes but we have no evidence to support this hypothesis.

To investigate this further, we undertook a single-center study to analyze whether non-native English speaking kidney allograft recipients who utilize official interpreter services suffer inferior clinical outcomes compared to kidney allograft recipients with English proficiency. In light of increasing numbers of kidney allograft recipients from the Black, Asian and Minority Ethnic (BAME) community to the United Kingdom, we consider this to be an important research question to investigate in detail.

Patients and Methods

Participants

This retrospective analysis involved data linkage between a numbers of electronic patient records to create a comprehensive database of all consecutive kidney transplants performed at a single-center between January 2007 and January 2015. This comprehensive database of a well-characterized clinical cohort was utilized for all subsequent analyses. Survival analysis was censored to event or September 2015 (whichever occurred first). We excluded multiple organ transplant recipients and our cohort only included kidney allograft recipients aged 18 and over; all other kidney allograft recipients were included for analysis.

Data collection

Data was firstly electronically extracted by the Department of Health Informatics for every consecutive kidney allograft recipient undergoing transplantation within those dates. Electronically extracted data included the following variables; age, gender, ethnicity (White, Black, South Asian, Other), smoking status (ever or never), donor type (living versus deceased), number of previous transplants, pre-transplant medical comorbidities (history of cancer, diabetes, cardiovascular disease, myocardial infarction, cerebrovascular events), cause of end stage renal disease, viral serology, socioeconomic deprivation (based on Index of Multiple Deprivation), clinical parameters (weight, body mass index), histopathology and biochemical parameters (creatinine, albumin-creatinine ratio, liver function tests, full blood count). Electronic patient records were then manually linked to admission health records to provide data relating to post-transplant outcomes (including cardiovascular events, strokes, septicemia, cancer, etc) and surgical complications. Patient and graft survival data, based upon date of death or graft failure respectively, was acquired from NHS Blood and Transplant and linked to our data.

Measures

All kidney allograft recipients remain under long-term follow up as outpatients. Biopsies were indication-based in the context of transplant dysfunction (categorized as 20% creatinine rise or new-onset proteinuria). Biopsy data was manually extracted and classified in accordance to latest Banff criteria [8]. Viral serology (e.g. polyoma virus) and/or donor-specific anti-HLA antibody was checked by indication-basis based upon transplant dysfunction or risk stratification.

Standardised immunosuppression protocols were in use over our study period. Induction therapy was with the anti-CD25 monoclonal antibody basiliximab (two doses of 20mg on day 0 and day 4 post kidney transplantation) and an intra-operatic dose of intravenous methylprednisolone (500mg). All patients subsequently received tacrolimus as their primary immunosuppressant, aiming for a target 12-hour trough level between 5-8 ng/L. Mycophenolate mofetil (MMF) was commenced at a dose of 1g twice daily and every recipient received maintenance corticosteroids at a dose of 10mg twice-daily prednisolone, which was subsequently weaned down to a maintenance low-dose 5mg once daily by 3-months post-transplantation in the absence of any rejection. Episodes of acute cellular rejection were treated with a bolus of corticosteroids, with T-cell depletion therapy for steroid-resistant rejection. Antibody-mediated rejection was treated with antibody removal by plasmapheresis +/- intravenous immunoglobulin. Standard antibiotic prophylaxis after kidney transplantation was; nystatin (3-month), co-trimoxazole (12-months), valganciclovir (3-months if deemed high risk [donor CMV+/recipient CMV-]) and isoniazid/pyridoxine (12-months if high risk for TB [previous TB, minority ethnic]).

Statistical analysis

Univariate comparisons of transplant recipients were done with chi-squared tests for categorical data, t tests for parametric continuous data, and Wilcoxon tests for non-parametric continuous data. All-cause graft failure was taken as the time from transplantation to graft nephrectomy or return to dialysis, whichever was earlier, or death of the patient with a functioning graft. Survival of the patient was defined as the time from transplantation until death. Follow-up analysis of the entire transplant study cohort included all data up to September 2015. Cox proportional hazards regression models were fitted by a stepwise variable selection method to analyze the combined effect of factors on patient and graft survival, reported as hazard ratios (HR). Variables of interest that were not found to have significant effects were added individually to the final model and are presented for illustrative purposes. Log cumulative hazard plots showed no evidence of non-proportionality of hazards. Kaplan-Meier curves were used to show patient and graft survival. All tests were two-sided and p values of less than 0.05 were judged to be significant.

Approvals

This study received institutional approval and was registered on the central audit database (audit identifier; CARMS-12578).

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The corresponding author had full access to all data. The work was conducted in accordance with the Declaration of Helsinki.

Results

Patient demographics

Data was extracted for 1,140 patients who received a kidney allograft, with median follow up to 4.4 years' post-transplantation. We divided the cohort into patients who used interpreter services (n=40) and those who did not (n=1100). Ethnicity breakdown of the cohort was; Caucasian (72.1%), black (5.5%), south Asian (17.6%) and other (4.7%). Interpreters had been requested for 40 kidney allograft recipients, with commonest languages required including Urdu/Punjabi (n=25), Arabic (n=2), Bengali (n=2), Gujrati (n=2) and single cases of 9 other languages.

Table 1 shows the difference in patient demographics when comparing those utilizing interpreters versus not. Patients who required interpreting services were more likely to be of south Asian ethnicity (80.0% of users versus 15.4% of non-users, p<0.001) and female (60.0% of users versus 39.5% of non-users, p=0.008). There was no difference in the age, weight or BMI of the patients who required interpreters and those that did not. Transplant recipients that utilized interpreters were less likely to be male (40%) and less likely to smoke (100% were non-smokers). They were more likely to have a history of diabetes (22.5% vs. 9.8% respectively, p=0.034). Interpreter service users were less likely to have had no previous dialysis and more likely to have been on haemodialysis as compared to the non-users. There was no difference between the virology status or mean post transplantation follow up time between the two cohorts. All interpreter services users only had a single transplant as compared to 89.9% of the non-users. Majority of the users (61.8%) fell in the lowest socioeconomic group (1 – most deprived) as compared to a 30.6% of the non-users and only 5.9% of the users were in the highest group (5 - least deprived).

Post-transplant histopathology

Table 2 compares the histopathology between patients requiring interpreter services or not. Comparing recipients using versus not using interpreting services, we observed less events of any rejection (2.5% versus 14.8% respectively, p=0.022) and cellular rejection (2.5% versus 13.5% respectively, p=0.052). However, the antibody-mediated rejection rates between users and non-users (0.0% versus 3.8% respectively, p=0.396) and mixed rejection rates (0% vs. 2.5% respectively, p=0.621) were similar. Specifically looking at south Asians who were primary users of interpreting services, those using versus not using interpreter services had less episodes of rejection (3.1% versus 14.8% respectively, p=0.053).

Post-transplant events and outcomes

As seen in table 3, there was no difference between the groups for development of post-transplant diabetes, cardiac events, cerebrovascular accidents or cancer. However, there was a significantly higher rate of patients without language proficiency being admitted to hospital with septicemia. There was a trend for more donor-specific anti-HLA antibody to be checked among non-interpreter versus interpreter users, both positive donor-specific anti-HLA antibody results were generally similar.

Table 3 highlights the unadjusted Kaplan Meier estimates showing no difference when comparing users versus non-users of interpreting services for patient survival (92.5% versus 92.9% respectively, p=0.551). Users had equal death-censored

Table 1: Patient demographics comparing patients using versus not using interpreters.

Variable		Interpreter	Non-Interpreter	P value
Number		40 (3.5%)	1100 (96.5%)	-
Age (mean)		48.3±13.6	46.1±13.8	0.335
Gender (male)		16 (40.0%)	665 (60.5%)	0.010
Baseline BMI (kg/m²)		26.6±5.7	28.2±7.0	0.117
ABO-incompatible		2 (5.0%)	52 (4.7%)	0.575
HLA mismatch (A, B, DR)		2.48±0.9	2.42±1.3	0.800
Cold ischaemic time (hours)		14.8±4.7	17.9±5.9	0.010
Ethnicity	White	2 (5.0%)	820 (74.5%)	<0.001
	Black	1 (2.5%)	62 (5.6%)	
	South Asian	32 (80.0%)	169 (15.4%)	
	Other	5 (12.5%)	49 (4.5%	
Smoking history		5 (12.5%)	269 (24.5%	0.054
Living-donor kidney transplant		7 (17.5%)	483 (44.6%)	<0.001
First kidney allograft		40 (100.0%)	989 (91.2%)	0.147
Dialysis vintage (days)		1130±1123	605±2046	0.007
Cause of end-stage kidney disease	Diabetes	9 (22.5%)	108 (9.8%)	0.016
	Glomerulonephritis	8 (20.0%)	306 (27.8%)	0.266
	Polycystic kidneys	5 (12.5%)	127 (11.5%)	0.502
Area of socioeconomic deprivation	1 (most deprived)	61.8%	30.6%	0.002
	2	20.6%	20.7%	
	3	8.8%	21.0%	
	4	2.9%	15.2%	
	5 (least deprived)	5.9%	12.5%	

Table 2: Histopathology comparing patients using versus not using interpreters.

Variable	Interpreter	Non-interpreter	P value
Number of biopsies (mean±SD)	1.2±0.4	1.8±1.3	<0.001
Cellular rejection	1 (2.5%)	149 (13.5%)	0.023
Antibody-mediated rejection	0 (0.0%)	42 (3.8%)	0.217
Mixed rejection	0 (0.0%)	27 (2.5%)	0.377
Any type of rejection	1 (2.5%)	163 (14.8%)	0.014
Interstitial fibrosis/tubular atrophy	0 (0.0%)	15 (1.4%)	0.583
Calcineurin inhibitor toxicity	2 (5.0%)	22 (2.0%)	0.205
Chronic damage	1 (2.5%)	39 (3.5%)	0.586
Acute tubular injury	4 (10.0%)	147 (13.4%)	0.371
Pyelonephritis	0 (0.0%)	17 (1.5%)	0.542
Thrombotic microangiopathy	0 (0.0%)	26 (2.4%)	0.391
Polyoma nephropathy	2 (5.0%)	37 (3.4%)	0.402
Recurrent disease	0 (0.0%)	26 (2.4%)	0.391

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graft survival (90.0% versus 89.8% respectively, p=0.615) and overall graft survival (82.5% versus 84.1% respectively, p=0.461) when compared to non-users. These survival results are visualized in Kaplan-Meier curves as shown in figures 1-3.

The equivalent survival between both cohorts was confirmed in a Cox Regression model after adjustment for other variables including age, gender, BMI, primary cause of ESRF, comorbidities (hypertension, diabetes), smoking status, type of kidney received (living/deceased, DCD/DBD), previous dialysis modality, no. of transplanted kidneys, post-transplantation follow up time, delayed graft function and Banff grade of rejection (Table 4).

Discussion

Our single-center study demonstrated kidney allograft recipients requiring interpreter services due to lack of adequate English do not suffer inferior outcomes compared to other kidney allograft recipients. In fact, non-native English patients requiring interpreter services were found to have lower risk for cellular or any-cause rejection. Our findings are reassuring for large transplant programs catering for multi-cultural populations and suggests active use of interpreter services in outpatient clinics is clinically beneficial.

No study has previously analyzed the link between language barriers and kidney transplant outcomes. However, previous work has identified language barriers prohibiting adequate access to kidney transplantation. From a living kidney donor

Table 3: Post-transplant events comparing patients using versus not using interpreters.

Variable		Interpreter	Non-interpreter	P value
CMV viraemia		3 (7.5%)	49 (4.5%)	0.278
Urological problems		1 (2.5%)	61 (5.5%)	0.347
Septicaemia requiring hospitalization		6 (15.0%)	67 (6.1%)	0.038
Post-transplant diabetes		3 (9.7%)	90 (9.1%)	0.547
Cardiac event		2 (5.0%)	67 (6.1%)	0.559
Cerebrovascular accident		2 (5.0%)	25 (2.3%)	0.244
Cancer		0 (0.0%)	69 (6.3%)	0.079
1-year eGFR		54.1±19.8	50.5±20.5	0.427
1-year albumin-creatinine ratio		12.3±18.6	17.1±57.1	0.307
Donor-specific antibody	Not checked	4 (10.0%)	297 (27.0%)	0.055
	Checked and positive	11 (27.5%)	260 (23.6%)	
	Checked and negative	25 (62.5%)	543 (49.4%)	
Patient survival		37 (92.5%)	1022 (92.9%)	0.551
Death-censored graft survival		36 (90.0%)	988 (89.8%)	0.615
Overall graft survival		33 (82.5%)	925 (84.1%)	0.461

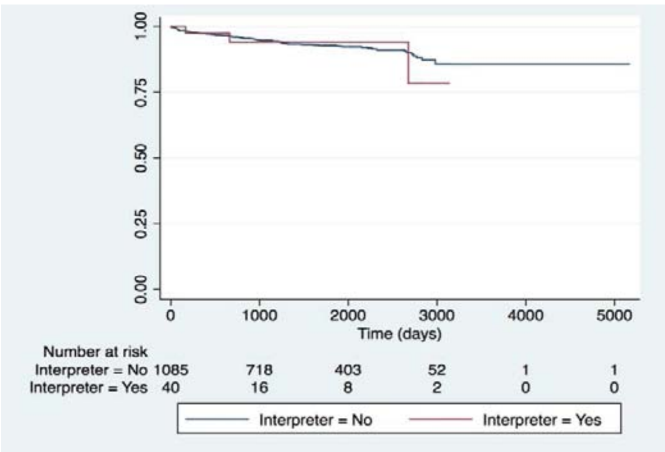

Figure 1: Patient survival for kidney allograft recipients using and not using professional interpreter services.

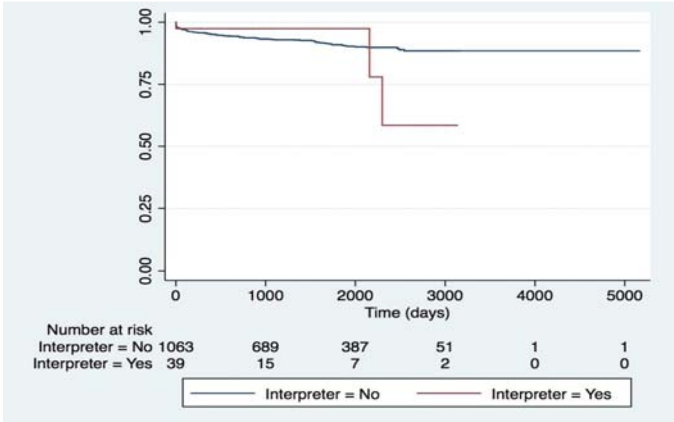

Figure 2: Death-censored graft survival for kidney allograft recipients using and not using professional interpreter services.

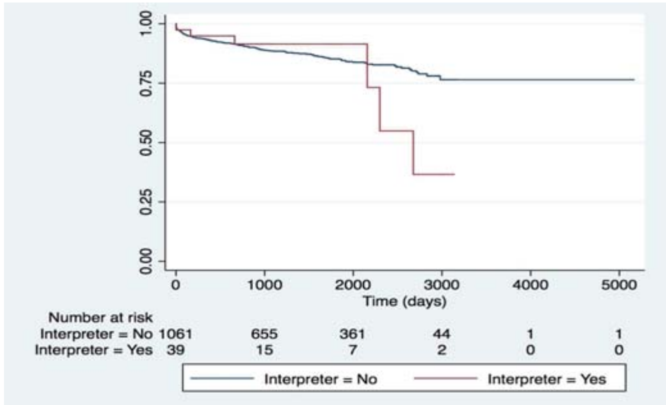

Figure 3: Overall graft survival for kidney allograft recipients using and not using professional interpreter services.

Table 4: Unadjusted and adjusted survival comparing patients using versus not using interpreters.

Survival function	Hazard Ratio	Interpreter users	P value
Patient survival	Unadjusted HR (95% CI)	1.148 (0.253-5.200)	0.858
	Fully Adjusted HR (95% CI)*	1.266 (0.399-4.015)	0.689
Death-censored graft survival	Unadjusted HR (95% CI)	1.086 (0.343-3.433)	0.889
	Fully Adjusted HR (95% CI)*	1.016 (0.230-4.484)	0.983
Overall graft survival	Unadjusted HR (95% CI)	1.274 (0.598-2.714)	0.530
	Fully Adjusted HR (95% CI)*	1.248 (0.476-3.273)	0.652

*Adjusted for age, gender, BMI, primary cause of ESRF, comorbidities (hypertension, diabetes), smoking status, type of kidney received (living/deceased, DCD/DBD), previous dialysis modality, no. of transplanted kidneys, post-transplantation follow up time, delayed graft function and Banff grade of rejection

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perspective, the most recent Consensus Conference meeting report looking at best practices in live kidney donation suggest one of the highest priorities is to "provide more culturally tailored LDKT education to racial/ethnic minority patients, with historically lower LDKT rates, and their support systems" [9]. Gordon and colleagues undertook a national study to explore transplant center provisions for providing education regarding kidney donation and transplantation in a culturally and linguistically sensitive manner [10]. Survey completion rate was 61% (280 of 461 transplant administrators responded). Most administrators reported their educations materials were primarily in a written format (93%). Reassuringly, written educational materials in Spanish were common (86%) and the provision of interpreters was also very frequent (82%), which were ranked of greater importance than holding educational classes in Spanish (39%), employing bilingual staff (51%) or bicultural staff (39%). However, there is little evidence that tailoring such material for the benefit of patients with linguistic barriers is effective at overcoming access disparity.

While the predominant languages for which interpreters were utilized were for South Asian languages, it should be noted that the commonest non-native language spoken in the United Kingdom is Polish (approximately 1% of the English and Welsh population) [5]. This may suggest native-Polish speakers are comfortable communicating in English during medical consultations post kidney transplantation or that we are under-utilizing the use of Polish interpreters for Polish speaking kidney allograft recipients. While many non-native English speakers may be able to communicate in basic terms, the complexity of discussing post-transplantation issues will likely be overlooked from both doctors and patients. In addition, language proficiency is not objectively assessed and formal tools should be employed for determination of functional health literacy [11]. Language proficiency should be formally documented for kidney allograft recipients and every effort should be made to ensure no language barriers exist for post kidney transplant consultations. This is important as self-reported health is important to discuss, due to the strong links with adverse outcomes including mortality [12,13].

In the contemporary era, face-to-face conversations with kidney allograft recipients with language barriers could be overcome with communication technology. In a review by Masland and colleagues, novel systems for utilizing communication technology were reviewed [14]. For example, a Californian consortium of public hospitals and their associated community clinics, psychiatric facilities, skilled nursing facilities, and public health departments implemented shared video interpretation services with video/voice-over Internet Protocol call center technology. The system automatically routed requests for interpretation in fifteen selected languages to a pool of thirty full-time interpreters and four trained bilingual staff. A shared network of interpreters can limit cost implications [15] and encourage improved outcomes as demonstrated in our study.

There are several limitations to this retrospective analysis that must be appreciated for the accurate interpretation of our results. There are likely to be numerous confounders that have an impact on mortality post kidney transplantation that we were unable to factor in (e.g. lifestyle factors, medications). Missing data (and misclassification bias) also has an implication on the analyses performed, which is an inherent bias in epidemiological analyses such as this. Electronic patient records may be susceptible to missing data and would not capture admissions to different hospitals, thereby under-estimating hospitalization for adverse events such as rejection or emergency admissions. However, survival data was obtained by linkage to national registries and therefore would be complete regardless of patient follow up. Our study was also likely to be under-powered, and of short duration, to robustly assess difference in some outcomes and further maturing of this database in the long-term should provide more definitive answers in the future. Most importantly, some kidney allograft recipients with linguistic barriers may not have utilized professional interpreting services and simply relied on family and/or friends for translation during professional consultations. Unfortunately, electronic patient records do not currently classify patients with language barriers but this should be implemented to ensure professional interpreting services are used for medical consultations.

To conclude, out single-center analysis has demonstrated no adverse outcomes after kidney transplantation for allograft recipients with linguistic barriers who utilize a professional interpreter. Our results are reassuring for transplant clinicians who may have concerns with regards to outcomes for patients with language barriers and our analysis suggests the use of professional interpreting services should be widely utilized to ensure post-transplant outcomes remain equivalent.

Acknowledgements

We are grateful for the funding in support of the BMedSci intercalated degrees for HG (from Arthur Thomson Trust) and FJS and ST (from Kidney Research UK).

Authorship

Designed study ST,JN,AS, Data extraction FJS,HG,ST,JM,FE, Data analysis ST,JM,FE, Data interpretation ST,JN,AS, Wrote original draft ST,AS, Reviewed manuscript FJS,HG,ST,JN,JM,FE,AS

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