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## Highlights

- Older adults are at particular risk of iatrogenic complications and poor outcomes.
  - Experienced geriatric mobile teams may help non-geriatricians in the drug management of older people.
  - Therapeutic advice given by a geriatric mobile team was not associated with better long-term survival.
  - Interventional studies are needed to clarify the benefits of geriatric mobile teams in the drug management of older inpatients.
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## Therapeutic advice issued by a Geriatric Mobile Team and 3-year mortality in older inpatients

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## **ABSTRACT**

Our objective was to determine whether the provision of therapeutic advice (i.e., any recommendation for an increase or decrease in drug dosage, or for the addition, withdrawal or replacement of at least one drug) by hospital geriatric mobile teams (GMTs) was associated with long-term mortality among older inpatients. Data on therapeutic advice provided by the GMT of Angers University Hospital, France, were collected from 694 consecutive inpatients examined in 2012 (mean age  $84.4 \pm 6.3$  years; 65.6% female), who were followed up after 3 years. We found no between-group differences regarding the 3-year mortality ( $P=0.30$ ) and no cumulative survival difference (log-rank  $P=0.43$ ). The provision of therapeutic advice by a GMT was not associated with better 3-year survival ( $HR=1.18$ ,  $P=0.40$ ) in these frail inpatients.

**Keywords:** geriatric mobile team; drug management; therapeutic advice; mortality; older adults

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## INTRODUCTION

Drug management is complex in older adults due to multimorbidity, polypharmacy and pharmacokinetic changes, placing them at particular risk of iatrogenic complications (1). Therapeutic choices are especially difficult during hospitalization for an acute condition, as any new treatments will be added to the patient's usual medications (2). Thus, the drug management of older inpatients is likely to make non-geriatricians uncomfortable, which justifies resort to specialized advice, notably from multiprofessional geriatric mobile teams (GMT). GMTs can give personalized therapeutic advice adapted to older inpatients' medical conditions. However, very few studies have focused on GMT therapeutic advice (3), and to the best of our knowledge none has examined the effect of therapeutic advice on long-term mortality. Our main objective was to determine whether the issuance of therapeutic advice by a hospital GMT was associated with 3-year mortality among older inpatients. We also examined the link with 2-month mortality.

## METHODS

The GMT of the University Hospital of Angers, France, is a functional unit that moves to the different hospital units receiving older inpatients (the emergency department, medicine, surgery) on their request, and provides medical as well as psycho-social assessment and discharge planning for older inpatients with complex multimorbidity. Angers GMT is composed of geriatric doctors, residents, nurses with expertise in gerontology, social workers and a secretary. Evaluations systematically combine the intervention of at least one geriatrician and one nurse.

All inpatients assessed by Angers GMT between 1 January and 31 December 2012 were included in

this longitudinal cohort study. In the case of multiple GMT interventions, only the first one was included in the analysis. The study was conducted in accordance with the ethical standards set forth in the Helsinki Declaration (1983). Angers ethical committee approved the study protocol (n°2015/10).

All included participants received a multidisciplinary comprehensive geriatric assessment by the GMT, which consisted of a structured health questionnaire targeting chronic diseases, namely the Cumulative Illness Rating Scale - Geriatric (CIRS-G) and the recording of usual medications, as well as a standardized clinical examination. The CIRS-G score quantifies the burden of chronic diseases among older adults by counting both the number and the severity of chronic diseases. The clinical examination included anthropometric measurements and a complete cardiac, pulmonary, oral, abdominal, neurological and rheumatological examination. Assessments of gait and fall risk, nutrition, pain, mood, cognition, abilities in daily living and social environment were also performed.

The recommendations finally issued by the GMT were classified into 3 groups: help with diagnosis, help with discharge planning, and therapeutic advice. All advice for dose escalation or reduction, the addition, withdrawal or replacement of any medication was considered to be the provision of therapeutic advice. Mortality data were collected by nurse phone call 2 months after the GMT visit, and 3 years later by one of the present authors (PYP), who consulted the electronic hospital medical records and checked with the family physician when no death had been noted in the patient records. All statistical analyses were performed using SPSS (v19.0, IBM Corp., Chicago, IL). As the number of observations was higher than 40, no transform was applied. P-values<0.05 were considered significant.

## RESULTS

Among 791 GMT interventions in 2012, all data were available for 694 patients (mean±SD age, 84.4±6.3y; 65.6% female; mean number of drugs daily taken, 6.7±3.0; 75.8% polypharmacy

$\geq 5$  drugs/day). Five hundred and twenty-one patients (75.1%) received therapeutic advice from the GMT. They were older ( $84.9 \pm 6.1$  years versus  $82.9 \pm 6.7$  years,  $P < 0.001$ ), had a greater morbidity burden (mean CIRS-G,  $12.9 \pm 3.9$  versus  $11.0 \pm 4.5$ ,  $P < 0.001$ ), and more often a history of accidental falls in the preceding 6 months (70.5% versus 60.8%,  $P = 0.043$ ) compared with those who received no therapeutic advice. There was no difference regarding the number of drugs ( $6.7 \pm 2.9$  versus  $6.5 \pm 3.3$ ,  $P = 0.47$ ) and polypharmacy (76.3% versus 73.4%,  $P = 0.50$ ).

All patients were followed up after 36 months. In total, 65 patients (9.4%) died during the first 2 months, without any difference between those who had or had not received therapeutic advice (9.4% ( $n=49$ ) versus 9.2% ( $n=16$ ),  $P = 0.95$ ). Similarly, we found no between-group difference regarding mortality after 3 years ( $n=152$ ; 22.6% ( $n=118$ ) versus 19.7% ( $n=34$ ) respectively,  $P = 0.30$ ). The Kaplan-Meier curve indicated no difference in survival according to the provision of therapeutic advice (log rank  $P$ -value=0.43) (Figure 1). The Cox model found no association between therapeutic advice and 3-year mortality ( $HR=1.18$  [95CI:0.80-1.74],  $P = 0.395$ ).

## DISCUSSION

We found no evidence for a difference in survival rates among older inpatients who had or had not received therapeutic advice from the GMT.

Several explanations may be proposed for this apparent lack of effect. First, it is possible that, contrary to our hypothesis, the GMT intervention was of no obvious benefit for long-term survival. This would be consistent with some previous reports (3), even if therapeutic advice was not specifically examined in these studies. Regardless, GMT interventions may still improve short-term care, notably shorten hospital stay and reduce the rehospitalisation rate (4). A second explanation concerns baseline differences between the two groups in our study. We found that those who received therapeutic advice were older and had a higher morbidity burden, which could have masked the effect of therapeutic advice on survival (if any). Thus, despite the poorer health condition at baseline of the patients receiving advice, that advice may have meant that their survival

rate that was no worse than that of the less frail group who had not received any therapeutic advice. The main limitation of our study was that it took place in a single university hospital, which might limit generalization to all older hospitalized patients. Also, the 3-year mortality data extraction could have missed some events, even if precautions were taken to prevent this. Finally, no information was available on whether the therapeutic advice was actually followed. However, a previous study in France reported that in 92% of instances the therapeutic advice offered by GMTs is followed (5).

Therapeutic advice issued by the hospital GMT was not associated with better long-term survival in this sample of frail older inpatients. Further research, preferably interventional, is necessary for a better understanding of the value of GMTs in improving drug management and related consequences in older inpatients.

## **Contributors**

Pierre-Yves Paré contributed to study concept and design, acquisition of data, analysis and interpretation of data, drafting of the manuscript, has full access to the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analyses.

Hélène Rivière contributed to acquisition of data, and critical revision of the manuscript for important intellectual content.

Raphaëlle Hureaux contributed to acquisition of data, and critical revision of the manuscript for important intellectual content.

Marion Chappe contributed to critical revision of the manuscript for important intellectual content.

Laurence Spiesser-Robelet contributed to critical revision of the manuscript for important intellectual content.

Frédéric Moal contributed to critical revision of the manuscript for important intellectual content.

Cédric Annweiler contributed to study concept and design, acquisition of data, analysis and interpretation of data, drafting of the manuscript, and study supervision.

### **Conflict of interest**

The authors declare that they have no conflict of interest.

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No funding from an external source was received for this study.

### **Ethical approval**

The study was conducted in accordance with the ethical standards set forth in the Helsinki Declaration (1983). The entire study protocol was approved by the local Ethical Committee of Angers University Hospital, France (number 2015/10).

### **Provenance and peer review**

Peer review was directed by Professor Margaret Rees independently of Cedric Annweiler, an author and *Maturitas* editor, who was blinded to the process.

### **Research data (data sharing and collaboration)**

There are no linked research data sets for this paper. Data will be made available on request.

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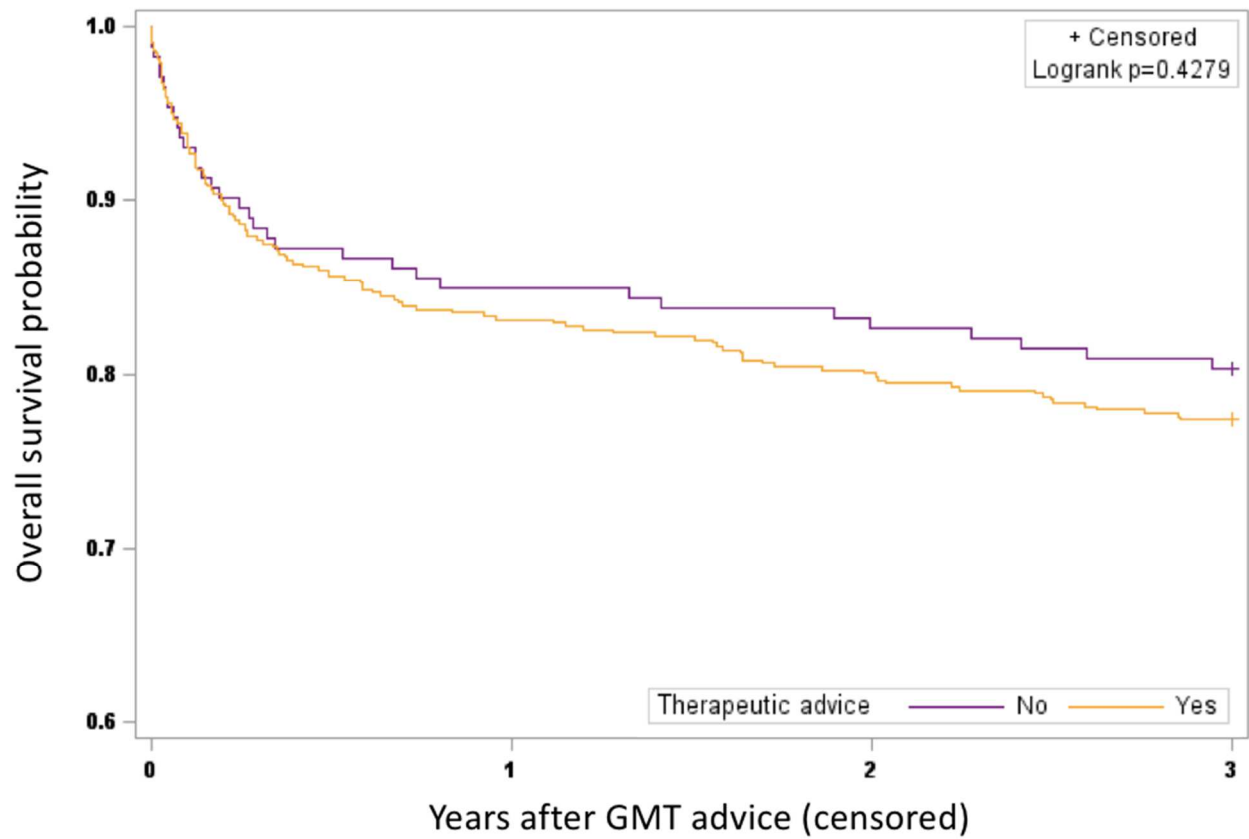


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**Figure 1. Cumulative survival probability for older inpatients who had and had not received therapeutic advice from the hospital geriatric mobile team, Angers University Hospital, 2012.**