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GENERAL PRACTITIONERS ARE NOT INFORM CONCERNING MEDICINE CRUSHING IN NURSING HOMES

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Abstract: *Background:* Behavioural disorders or swallowing difficulties result in delivery of medication in crushed form for more than 30% of older people living in the community and 23% in the nursing home (NH). This practice can results in poor efficacy of the treatment. Based on the recommendations from the French National Authority for Health, general practitioners (GP) should be informed when their patient's pills are crushed by the nurses. Our aim was to assess knowledge of general practitioner on medication delivered in crushed form to their patients in NH settings. *Materials and method:* A survey of practice was send in January and February 2013 to 63 coordinating physicians (CPs) working in 63 NH in the south of France. Self-administered questionnaire were sent. The subject of the questionnaire was information given to general practitioners (GPs) and medicine-crushing practices in NH. *Results:* Sixteen CPs (25.4%) agree to participate. Nine of them (56.3%) reported that they did not tell GPs about medicine crushing. Only one CP reported that his NH had a written protocol of information for GPs. However, no CP reported having a written protocol on medicine crushing. Only one CP reported that the reason for crushing medicine was systematically reported by the nurses of the NH in the charts. *Conclusion:* Despite national guidance, CPs reported that they did not frequently inform attending GPs when medicines were crushed.

Key words: Crushing pills, elderly patients, nursing home, general practitioner.

Introduction

The estimate number of disabled patient will probably be around 1,200,000 in 2015 in France (1). In 2008, 515,000 were living in nursing home (NH) and this number is going to grow very fast in the coming years (2). The nursing home residents are often dependant, demented with a mean number of medications of eight. The general practitioners (GPs) must be sensitive to the risk of polypharmacy and inappropriate medication with these patients and must detect the frailty to adapt their prescriptions (3). In 2009, in this disabled population, 30 to 40% of the patient received their pills in a crushed form (4). Other authors have raised the poor quality of the administration of medicines and the inappropriately altered medication in nursing homes (5). Swallowing difficulties and behavioural disorders are reported to be the two main reasons for medicine crushing (4). Unfortunately 42% of crushed medicines are uncrushable-medication. Inappropriate-technique and food-drug interactions have also been reported (6).

Medicine crushing can be dangerous (7). It is an important risk factor for medication administration errors and increases the risk of side-effects such as falls (8, 9). Drug-nutrient interactions can occur, especially in the elderly (10). Crushing different medicines together can result in drug-drug interactions which would not occur if those medicines were administered simultaneously but without being crushed. These drug-drug interactions have been described among 138 residents living in two NH by Tamai and al. They identified 24 suspected cases of drug-drug interaction, of which 11 altered the metabolism or action of at least one medicine (11). When a single crusher/grinder is used for the residents, a significant risk of interaction between multiple patients' drugs exist (11).

To improve medication administration in NH residents, the French Health Authority has edited in 2010 national recommendations on medicine crushing (12) (Table 1). The recommendations advocate that medicines should be crushed separately from one another, that crushed medicines should be administered in a neutral vehicle (iced water) rather than mixed into nutrients, and that only one piece of crushing/grinding equipment per patient should be used (12). GPs should be aware of the risks associated with this practice and informed by the CPs of the NHs to adapt their prescriptions. Since these recommendations, no study has investigated whether the information related to medicine crushing in NH are communicated to the GPs.

The aim of our study was to describe the information given to the GPs by CPs when medicines are crushed and to describe NH' medicine-crushing practices.

Material and methods

Study Sample

A survey was carried out among CPs working in the South West of France (Toulouse area) to a sample of 63 CPs. CPs are in France in charge of coordinating the geriatrics domains of the NH (comprehensive geriatric assessment, geriatric training

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Table 1
2010 French Health Autority recommendations on medicine crushing

Prescribing medicines:	Restrict prescriptions to essential medicines.
	Look for alternative formulations (e.g. oral solution, orodispersible tablet), or alternatives to medicine crushing in the form of other drugs (equivalent active ingredient with appropriate formulation) or other non-drug treatments.
	Establish the reason for crushing and include it on the prescription form.
	Contact the pharmacy in the case of medicines for which specific precautions must be taken during preparation (e.g. cytotoxic drugs) or to find an alternative treatment.
Preparing medicines:	Preparation must be carried out by a nurse.
	Always check whether the medicine is crushable by referring to the list of non-crushable medicines.
	One crusher-grinder per patient.
	Crush and administer medicines individually.
	Crush the medicine immediately before administering it. If this cannot be done, repeat preparation.
	Wash the equipment with water (± soap) following every use.
Dispensing medicines:	Once a medicine has been crushed, avoid putting it in any container before transferring it to the vehicle. Where this is not possible, ensure that the container does not contain remnants of other substances and label it with the patient's name and the drug name.
	The vehicle must be neutral: thickened water, no liquidized food.
	Drugs must be administered at the correct time in relation to meals.
	Administration must be carried out by a nurse or may be delegated to a nursing assistant.
	Specific precautions must be followed when handling certain medicines (e.g. cytotoxic drugs).
	Hands must be washed using hand sanitiser between patients.
Pharmacy:	Make a list of crushable medicines available to prescribers and nurses.
	Inform nurses and physicians if specific precautions should be taken for certain medicines (gloves, goggles or face mask).

of the team, prevention, coordination with the GPs). They have a geriatric training. CPs are not in charge of the prescription but have to improve medication of the resident on coordination with the GPs. Communication and training of the GP is an important aspect of their mission.

A panel of 63 CP members of an independent medical association dedicated to the medical training in geriatrics and NH care was investigated. A self-administered questionnaire was sent by email in January 2013 in Toulouse area. The questionnaire had to be completed and returned before the 7th March 2013. Data were then extracted and analyzed using Excel 2010.

The questionnaire

The CP fulfilled a self-administrated questionnaire of 16 questions. The CPs were asked about the information given to the GPs about medicine-crushing practices according to the national recommendations such as 'Is the patient's GP informed when a medication is crushed/ground?' (always – often – seldom – never). Various dichotomic questions (yes/no) were also asked about the practice of crushing pills. CPs were also asked to reported the age of the residents in their NH, their level of disability, the percentage of residents with crushed medication, the number of crushed medication among the all prescription of each residents and whether they known the type of equipment used to crush medicines (examples of various crushing/grinding devices were proposed in photo Figure 1). Number of GPs working in NH was also reported.

Figure 1

The various tools used to crush medicines (a: sachets, b: electrical, c: manual, and d: pestle). Of these, only sachets (a) and the manual crusher-grinder (c) are recommended by the HAS. The manual crusher-grinder (c) is recommended if each patient is assigned their own piece of equipment

a- Source: Silent Knight mechanical tablet crusher. armen-sante.com; b- Source: SEVERO electric medicine grinder. severo.biz; c- Source: Manual tablet crusher. msmedical.net; d- Source: Pestle. la-carpe.com

Results

Sixteen responses were received and analyzed, giving a response rate of 25.4%. Ten CPs out of a total of 16 respondents were men.

Practices of crushing medicine

Information concerning 1187 nursing home residents were collected. Based on CPs answers, middle age of the residents was 83.5 (SD=9) and more than half were severely disabled based on the French GIR scale (Groupe Iso-Ressouces, the French scale used for funding of the nursing home).The mean number of GP per NH was 18 (SD = 12). The CPs reported that 23% (SD=3; min=3%; max=51%) of the residents had their medicines crushed. The mean number of medication crushed per resident was 4 (SD=3; min=1 max=12).

Details about the information about medicine crushing are presented in Table 2.

Information given to GPs

Nine out of 16 CPs (56%) reported that they seldom or never informed attending physicians when medicines had to be crushed. Seven CPs (44%) reported that they often informed attending GPs. None of the CP reported that attending physicians were systematically informed. Only one CP reported that they had a written protocol to inform the GPs; in that NH, the CP did not report that attending GPs were systematically informed of this.

Discussion

Our study suggested that crushing medicine practice is often performed for NH residents and poorly reported to the prescribers.

Table 2

Medicine-crushing practices reported by Coordinating Physicians (CP) of the Nursing home to the prescribers (General Practitioners; GP)

	Number of CPs (n=16)	Percentage (%)
GPs are informed :		
- Always	0	0
- Often	7	44
- Seldom	4	25
- Never	5	31
Existence of a written protocol on GPs' information	1	6
Existence of a written protocol on medicine crushing	0	0
Existence of a list of non-crushable medicines	7	44
If a list exists, disponibility (n=7) :	7	100
Reason for medicine crushing given on prescription form	1	6
Equipment used:		
- sachets	7	44
- pestle	2	13
- manual	5	31
- electric	2	13
Individual crusher-grinder	9	56
Medicines crushed as they are dispensed	12	75

Previous study has reported a high rate of crushing medicine practice in institution of care. In the United Kingdom, Stubbs et al. reported in unit of geriatric psychiatry that 26% of the medicines were crushed and that 44% of these crushed medicines were crushed without the prescriber's approval (13). The same findings are reported in our study. About one to four resident had their medicines crushed.

A recent Norwegian study reported that in a sample of 2108 NH patients across 65 NH, 23% had at least one crushed drug. These drugs are mainly mixed into food or drink and 10% of the residents had at least one non-crushable drug crushed (5). Our study did not investigated the details of the delivery approach but the rate of crushed medicine is similar.

The lack of information to the GP about medicine crushing in the NH and the poor impact of the current national recommendations on medicine crushing rise several comments: First, both drug-drug interactions may results in adverse health events and eventually in legal concerns for medical staff. Indeed, in theory, the recommendations support that health workers (e.g. doctors and nurses) are legally obliged to justify why medicines are crushed (14). Second, regular contact with medicines has been reported to lead to contact allergies in nursing home staff (15). Drug-drug interaction among the residents and contact allergies among the NH staff, related to the crushed medicine may be underestimated. Cutaneous allergies to tetrazepam after administering this medicine in crushed form have been recently reported from nurses (16).

Our result supports that this frequent and sometime unavoidable practice should be perform with caution and improved in its procedure. Reducing this practice when inappropriate should be the first step. An interventional study conducted in the Netherlands showed that implementing a protocol in NH on medicine crushing for residents with swallowing difficulties reduced the number of errors involving the crushing of non-crushable medicines by 63% (6). In 2000, an Australian study concluded that recommendations on medicine crushing were required in retirement homes (17). Another study showed that an educational intervention on drug use in NH reduced the risk of delirium, falls and reduced the use of health care resources (18). Our study suggests that recommendations are not sufficient. Written protocol and communication between prescribers and nurses are also required. In 2005, a Dutch study showed that regular meetings between GPs and coordinating physicians made it easier for patient information to be exchanged (19). More implication of the pharmacies is probably a relevant option. The adoption of such measures would allow drug prescriptions to be better tailored to patient needs.

Conflict of interest: The authors have no conflict of interests to declare.

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