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ADVERSE RESPIRATORY EVENTS DURING EATING/FEEDING OF LONG TERM CARE INSTITUTIONAL PATIENTS

E. Lubart, R. Segal, M. Belov, L. Sadogorsky, L. Valinsky, A. Leibovitz

Abstract: *Background/ Objectives:* Oropharyngeal Dysphagia is highly prevalent in long term care patients (LTC) frequently raising concerns regarding aspiration during eating/feeding .The aim of this study was to monitor and collect, for the first time, feeding related adverse respiratory events in LTC hospitalized patients. *Design/Participance:* 155 patients in the LTC wards of a geriatric hospital were followed for 29 weeks. Adverse respiratory events related to feeding such as choking or dyspnea were recorded. Patients were stratified according to the different stages of the Functional Outcome Swallowing Scale (FOSS). *Results:* There were 755 adverse respiratory events (24 choking events– 3%: and 731 dyspnea episodes – 97%) during 10780 patient days of the study. Calculated per patient days it makes 1 in 46 for choking and 1 in 13 for dyspnea. Adverse respiratory events occurred with similar frequency in the different groups regardless of FOSS stage. *Conclusions:* Our results indicate that regardless of the state of dysphagia and feeding method, the potential risk of feeding related respiratory events is similar among LTC elderly patients. Further studies from similar facilities could contribute to the evaluation of these data and eventually consider them as quality of care markers of the eating/feeding process in long term care patients.

Key words: Adverse respiratory events, feeding, elderly patients.

Introduction

Feeding dependency and oropharyngeal dysphagia (OD) are common conditions among long term care (LTC) patients, with an incidence ranging from 30% to 70 % (1, 2). Swallowing disorders are highly prevalent in this elderly population because dysphagia is associated with conditions that are much more common in the institutionalized LTC population, such as stroke, Parkinson's disease and dementia (1). This condition requires staff to ensure they get adequate assistance during food intake and maintain proper nutritional status (3). Over time, in these patients, mainly the demented, cooperation diminishes and OD worsens, making eating increasingly difficult, inefficient, and even dangerous, thus bringing the issue of enteral tube feeding into consideration (4, 5). Hence, in any LTC facility, there are patients in various stages of dysphagia; some of whom are fed orally by the staff, and others who receive long term enteral nutrition.

Adverse respiratory events related to feeding, such as aspiration, choking and dyspnea are threatening complications that occur in 4% to 95% of patients with OD and those fed through enteral tubes, with an associated mortality rate of 17% to 62% (6,7). Patients with advanced dementia , who constitute the leading majority have a high mortality rate; infections, such as pneumonia, and severe eating problems that are likely to develop in the terminal stage (8). The development of the Functional Outcome Swallowing Scale (FOSS) (9) makes it possible to categorize nondysphagic and dysphagic patients as well as those fed by enteral tubes. As mentioned earlier, adverse respiratory symptoms during the feeding process are indicators of pending of complications due to inadequate feeding and the need to take measures in order to prevent them. Mealtimes are extremely busy times in LTC facilities with the (always in shortage) nursing staff recruited to assist with feeding. Nurses at various levels, of skill and preparedness are often required to feed and closely supervise different kinds of patients with OD or limited cooperation or both.

The aim of this study is to examine adverse respiratory events related to the feeding process in long term care wards. Our scope was to collect data on the number of adverse respiratory events, their frequency and their distribution according to the various levels of OD of the patients.

Quantification of this phenomenon could help nursing

Geriatric Department, Shmuel Harofeh Geriatric Medical Center, affiliated to the Sackler Faculty of Medicine, Tel Aviv University, Israel.

Corresponding Author: Lubart Emily MD, Shmuel Harofeh Medical Center, Beer Yaakov, POB 2, Israel. Tel. 97289258664, Fax 97289258665, Mail : elubart@hotmail.com

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managers to allocate tasks during mealtimes based on clinical considerations and to give priority to the most risky categories. It has been recently emphasized that nursing home staff education, management and adaptation of feeding techniques are essential in improving outcome of assisted feeding (10, 11). Data on this subject, hitherto unexplored could also provide a first basis of its evaluation as quality of care marker in LTC.

Methods

This study was conducted in "Shmuel Harofe" Hospital, a multilevel geriatric hospital with nearly 400 beds affiliated to Sackler Medical School, Tel Aviv University. Participants were the patients of four long term care wards, each comprising about 36 patients in different FOSS stages. All clinically stable patients during a six months period, with various comorbidities were recruited to this study. Patients with terminal cancer and those with severe decubitus ulcers (more than one, grade 4) were excluded.

We used the Functional Outcome Swallowing Scale (FOSS) (9), encountering six stages as follows: stage 0 - normal function and asymptomatic; stage I - normal function but with episodic or daily symptoms of dysphagia; stage II - compensated abnormal function manifested by significant dietary modifications or prolonged mealtime (without weight loss or aspiration); stage III - decompensated abnormal function with weight loss of 10% or less of body weight over 6 months due to dysphagia, or daily cough, gagging, or aspiration during meals; stage IV - severely decompensated abnormal function with weight loss of more than 10% of body weight over 6 months due to dysphagia, or severe aspiration with bronchopulmonary complications, non-oral feeding recommended for most of nutrition, and stage V - enteral feeding for all nutrition. Feeding pattern and body weight are constantly observed, repoted and discussed during the staff meetings. This multidisciplinary forum , including the ward speech-therapist, the ward dietitian and the ward head-nurse determine the FOSS of the patients. At each stage patients are assisted by the staff.. FOSS 5 stage, meaning enteral feeding, is initiated after carefull attempts of oral feeding and serious risk of undernutrition , dehydration and aspiration.

Patients on oral feeding receive daily adequate nutrition and hydration according to the recommended dietary allowances (RDA) requirements; three meals a day, two of them containing 600 kcal each and one containing 500 kcal; totaling 1700 kcal a day.

Patients on enteral feeding receive a routine formula of Easy fiber (Teva Medical, Israel), four meals a day, lasting about 30-60 minutes each. Each meal contains 400 kcal, totally 1600 kcal; in a volume of about 1600 cc, and additional water of 600 cc per day. All our enterally fed patients are on naso-gastric tubes - NGT. They were fed in either sitting position in a wheel chair, or lying in bed at 60º, with the help of a Kangaroo device (OST Medical SentinelTM Enteral Feeding Pump)

The staff: physicians and nurses were instructed and asked to pay special attention and record any adverse respiratory event associated to the feeding time that occur during it or up to 30 minutes afterward.

During 29 weeks the investigating physician performed periodical (at least 3 times a week) visits in each ward and examined the files of all patients that were included in the survey and collected all recorded relevant clinical data.

The adverse respiratory events in this study are: any clinical disturbance such as choking or dyspnea associated with the feeding process. Most "dyspnea " deffinitions relate it not only to increased breathing rate but also to the subjective feeling of breathlessness of the patient. Since the majority of our patients are cognition handycaped we use for dyspnea definition, increased breathing rate (over 18/minute) with eventual signs of respiratory distress (12, 13).

Statistical analysis was performed using SPSS software, descriptive statistics were calculated and a chi-square test was performed. For the statistical evaluation the patients were divided in three groups according to the FOSS: patients on enteral tube feeding, (FOSS 5) orally fed (OF) patients without swallowing problems (FOSS 0) and orally fed patients in different stages of dysphagia according to the FOSS grades from 1 to 4.

Results

One hundred and fifty five patients were observed during a period of 29 weeks. The mean follow up period was 68. 8 ± 69 days per patient (range 203 – 7 days).

The overall number of patient days in follow up was 10,780. A total number of 759 adverse respiratory events during feeding were recorded, an average of one event for every 13 patient days . As for the more severe cases such as choking, these occurred once every 46 patient days.

Table 1 shows the demographic and the medical data of the study population. Table 2 shows the distribution of all the adverse respiratory events during feeding according to the FOSS category. Only 32 patients (20.5%) were defined as FOSS 0 while 86 (55%) were enterally fed - FOSS 5. As mentioned previously FOSS 1 to FOSS 4 categories were grouped together.

No significant difference was noted for the frequency of adverse respiratory events during feeding/eating time for these groups. Approximately one third of each group had one respiratory event during eating/feeding, about one third had 2 to 3 events and one third of the enterally fed (FOSS 5) had more than 4 events.

Table 1
Demographics and medical details of the 155 patients

Age	81.1 ± 10.1
F / M	63% / 37%
Follow-up (patient days)	10780
Comorbidity	
Dementia	81(53%)
Hypertension	67(40%)
CVA*	62(40%)
Pressure ulcer	55(35%)
Anemia	47(30%)
Drugs	
Laxatives	115(73%)
H2 blockers	78(50%)
Hypnotics	51(33%)
Aspirin	47(30%)
ACE- inhib.**	46(29%)

*Cerebro vascular accident; ** Angiotensin converting enzyme inhibitors

As for the more severe episodes such as choking, 24 cases were documented during the study period. There were no significant differences (p=0.25) between the rate of choking events among the different FOSS groups.

As for the events of dyspnea the rate was equally distributed between the groups (about one third in FOSS 0, FOSS 1-4 and FOSS 5) (table 4).

Most of these cases were symptomatically treated by temporary feeding cessation and observation , sometimes supplemented by oxygen. Chest x-rays were performed based on the clinical decision of the patient's physician in 21% (5) of 24 cases with a choking event and in 3 of them aspiration pneumonia was diagnosed.

Discussion

The overall rate of all adverse respiratory events was one for every 13 patient's days whereas for choking it was one for each 46 patient days. These data are reported for the first time so we cannot compare them with those from similar facilities. As for the distribution among the FOSS

Table 2
Incidence of all adverse respiratory feeding events during feeding/eating time in the study period (155 patients)

Adverse resp feeding events	FOSS 0 32 patients	FOSS 1-4 37 patients	FOSS 5 86 patients	Total 155 patients
0	12 (37.5%)	12 (32.4%)	23 (26.7%)	47 (30.3%)
1-3	9 (28.1%)	18 (48.6%)	27 (31.4%)	54 (34.8%)
4+	11 (34.4%)	7 (18.9%)	36 (41.8 %)	54 (34.8%)

p=0.11

Table 3
Incidence of choking during eating/feeding time during the study period (155 patients)

Choking	FOSS 0 32 patients	FOSS 1-4 37 patients	FOSS 5 86 patients	Total 155 patients
0	30 (93.8%)	31 (83.8%)	70 (81.4%)	131 (84.5%)
1-3	2 (6.2%)	6 (16.2%)	16 (18.6%)	24 (15.5%)

(p=0.25)

Table 4
Incidence of adverse respiratory events (dyspnea) during eating/feeding time during the study period (155 patients)

Dyspnea	FOSS 0 32 patients	FOSS 1-4 37 patients	FOSS 5 86 patients	Total 155 patients
0	12 (37.5%)	12 (32.4%)	23 (26.7%)	47 (30.3%)
1-3	9 (28.1%)	19 (51.4%)	27 (31.4%)	55 (35.5%)
4+	11 (34.4%)	6 (16.3%)	36 (41.8%)	53 (34.2%)

(p=0.051)

categories, surprisingly it did not differ between the 3 groups; orally fed patients without dysphagia (FOSS 0), orally fed patients with dysphagia (FOSS 1-4) and those tube fed, (FOSS 5).

A considerable number of patients 108 (70%) had at least one adverse respiratory event during the 29 weeks of the study. There was no significant difference in the frequency of the events between the various categories of the FOSS. Even among patients in FOSS 0 about one third had adverse respiratory events during feeding.

Surprisingly one could conclude from these data that the risk of respiratory events is neither related to the existence or severity of overt oropharyngeal dysphagia nor mitigated by enteral feeding. It has been recently stated (14) that conservative hand feeding should be preferred whenever possible. This could be augmented by specific feeding techniques (10). Nevertheless dyspnea is considered a warning sign (15) and such an event should be a clear indication to cease feeding/eating and closely observe for further clinical development.

Various risk factors for feeding complications in patients on assisted feeding have been described. The North American summit on aspiration in critically ill patients classified the risk factors for it, as major and additional factors (16, 17). The major factors are: a documented previous episode of aspiration, advanced age, decreased level of consciousness, neuromuscular disease and structural abnormalities of the respiratory-digestive tract, tracheal intubation, vomiting, persistently high gastric residual volumes and the need for prolonged supine position. The additional factors are the presence of a nasoenteric tube, intermittent feeding, abdominal/thoracic surgery or trauma, delayed gastric emptying, poor oral care, age, inadequate nursing staff, large size or diameter of feeding tube and malpositioning of the feeding tube (6, 16, 18, 19). In a prospective study of LTC residents 25% of the study group aspirated during the observation period and 56% of the aspirations events progressed to radiologically proven cases of pneumonia (20). Mitchell et al (8) showed that patients with advanced dementia have a high mortality rate due to infections, such as pneumonia, febrile episode, and eating problems are likely to develop in the terminal stage of dementia.

Nevertheless, occurrence of adverse respiratory events seem to be equally frequent among patients regardless of the OD level. This conclusion should be of course supported by reports from other LTC facilities.

One limitation of our study is the fact that we cannot prove that all respiratory events were causally related to the feeding process at the time of occurrence.

Our study emphasizes the potential risk of the feeding/eating time for all patients of long term care facilities and calls for appropriate staff allocation and management of this daily "operation". Further studies should provide comparison between facilities and lead to the documentation of adverse respiratory events during eating time as quality of care markers.

Conflicts of interest: All authors have no financial disclosure or conflict of interest in this study.

Ethical standards: The content of this paper has not been published elsewhere. The protocol for the research project has been approved by a suitably constituted Ethics Committee of the institution within which the work was undertaken and that it conforms to the provisions of the Declaration of Helsinki (as revised in Tokyo 2004).

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