

ORIGINAL

Family-member presence during lumbar puncture. Opinion of parents and healthcare providers. Does it influence the success rate of the procedure?

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Abstract

Introduction: The main aim of this study was to evaluate the opinion of family members and healthcare providers regarding the presence of family members during the performance of lumbar puncture (LP). We also analyzed whether family-member presence influences the success rate of the procedure.

Material and methods: A prospective study was conducted including all LP performed over a two-year period. The opinion of family members and healthcare providers involved in the procedure was collected through surveys, creating two comparison groups depending on whether a family member had been present or not. The association between family-member presence and the LP success rate was analyzed based on the number of failed, traumatic punctures and number of attempts.

Results: 44 lumbar punctures were performed, 45.5% of which in the presence of a family member. Family members generally perceived their presence to be beneficial and they were satisfied with the procedure. Among the healthcare professionals, differences of opinion were observed between doctors and nurses. Nurses considered the influence of the presence of the family member on the possible failure of the procedure to be more significant ($p < 0.01$). However, no significant differences were found in the number of failed or traumatic LPs, or the number of attempts required when comparing LP performed in the presence or absence of family members.

Conclusions: Parents express the desire to accompany their children during LP and their presence does not increase the risk of failure of the procedure. Satisfaction rate of the family and healthcare staff was high; however, family presence during LP remains limited in our center.

PRESENCIA DE LOS FAMILIARES DURANTE LA REALIZACIÓN DE PUNCIÓNES LUMBARES EN PEDIATRÍA: OPINIÓN DE PADRES Y SANITARIOS. ¿INFLUYE EN EL ÉXITO DE LA TÉCNICA?

Resumen

Introducción: El objetivo principal es conocer la opinión de familiares y sanitarios acerca de la presencia de los padres durante la realización de las punciones lumbares (PL). Además analizamos si la presencia del familiar influye en el éxito de la técnica.

Material y métodos: Se realizó un estudio prospectivo incluyendo todas las PL realizadas durante dos años. Se recogió la opinión de familiares y sanitarios implicados en

el procedimiento mediante encuestas, creando dos grupos de comparación en función de si el familiar había estado presente o no. Se analizó la relación entre la presencia familiar y el éxito de la PL en base al número de punciones fracasadas, traumáticas y número de intentos.

Resultados: Se realizaron 44 punciones lumbares, el 45,5% en presencia de algún familiar. Los familiares en general opinaron que su presencia era beneficiosa y se mostraron satisfechos con el procedimiento. Entre los sanitarios encontramos diferencias de opinión entre médicos y enfermeras, considerando estas más relevante la influencia de la presencia familiar sobre el posible fracaso de la técnica ($p < 0,01$). No se obtuvieron diferencias significativas en el número de PL fracasadas, traumáticas, ni el número de intentos comparando las PL realizadas en presencia y ausencia del familiar.

Conclusiones: Los padres quieren acompañar a sus hijos durante las PL y su presencia no aumenta el riesgo de fracaso de la técnica. Encontramos una alta tasa de satisfacción familiar y por parte del personal sanitario. Sin embargo, la presencia de los familiares durante la realización de las PL en nuestro centro está aún poco extendida.

INTRODUCTION

In recent decades, the classic paternalistic model of care has gradually been replaced by a model based on recognition of patients and their families, known as patient- and family-centered care in the medical literature⁽¹⁾. In this new care model, the physician considers the patient's cultural and familial background when providing treatment, and emphasizes the active involvement of both the patient and their family throughout the entire care process, including decision-making, treatment administration, and invasive procedures⁽²⁾.

Family-member presence during invasive procedures is a fundamental part of this new philosophy of health care. Since the 1980s, multiple studies have shown that family members wish to be present during such procedures⁽³⁾, that their presence is beneficial for the patient and their families^(4,5), and that it does not interfere negatively in the medical care process⁽⁵⁾.

Nevertheless, in our setting family-member presence during invasive procedures is limited. A study published in 2014 by Angel *et al.*⁽⁶⁾ shows an increase in family-member presence in pediatric emergency units in our country in recent years, although it is still infrequent, especially during more invasive procedures. In the case of lumbar puncture (LP), considered a moderately invasive procedure, family presence was only contemplated in 50% of the pediatric emergency units included in the above-mentioned study.

The primary objective of our study was to assess the impact of family-member presence during lumbar punctures (LPs) and to examine the perspectives of both family members and healthcare providers on this matter. The secondary objective was to investigate whether family-member presence has an influence on the success rate of the procedure.

MATERIAL AND METHODS

A prospective observational descriptive study including all LPs performed in patients under 16 years of age at the pediatric emergency and inpatient unit of a tertiary-care hos-

pital over a 2-year period (January 1, 2020, to December 31, 2021). No study-related interventions were implemented with regard to the procedure itself, family-member presence, or the location of the procedure in any of the cases. All decisions were made by the health care team.

Two survey models were designed depending on whether the procedure had been performed in the presence or not of a family member. The surveys consisted of closed multiple-choice questions regarding demographic data, degree of satisfaction, and personal experience during the procedure.

In all cases, the family member of the patient who underwent LP and the healthcare providers who intervened during the procedure (pediatrician and nurse) were included. When more than one pediatrician was required, each one completed a separate survey.

In addition, the association between family-member presence and failure of the procedure was analyzed using two parameters: rate of LP failure, defined as either no cerebrospinal fluid obtained or a traumatic LP (red blood cells $\geq 10,000$ cells per microl), and total number of attempts.

The statistical analysis was performed using the statistical program SPSS version 20.0. For between-group comparisons, the χ^2 test was used for categorical variables and the student's t-test and Mann-Whitney U test for quantitative variables with normal and non-normal distribution, respectively. The level of statistical significance was set at $p < 0.05$.

The study was approved by the hospital ethics committee.

RESULTS

During the study period, 44 LPs were performed, 24 of which in the emergency room (54.4%).

The mean age of the patients was 77 months (standard deviation [SD] 66); 52.3% were female, and 27.3% had undergone a previous invasive procedure, including LP, urinary catheterization, and chest drainage, among others.

Forty-four surveys were completed by family members and nurses, respectively, and 54 surveys were completed by physicians, as in 10 cases the intervention of more than one physician was required.

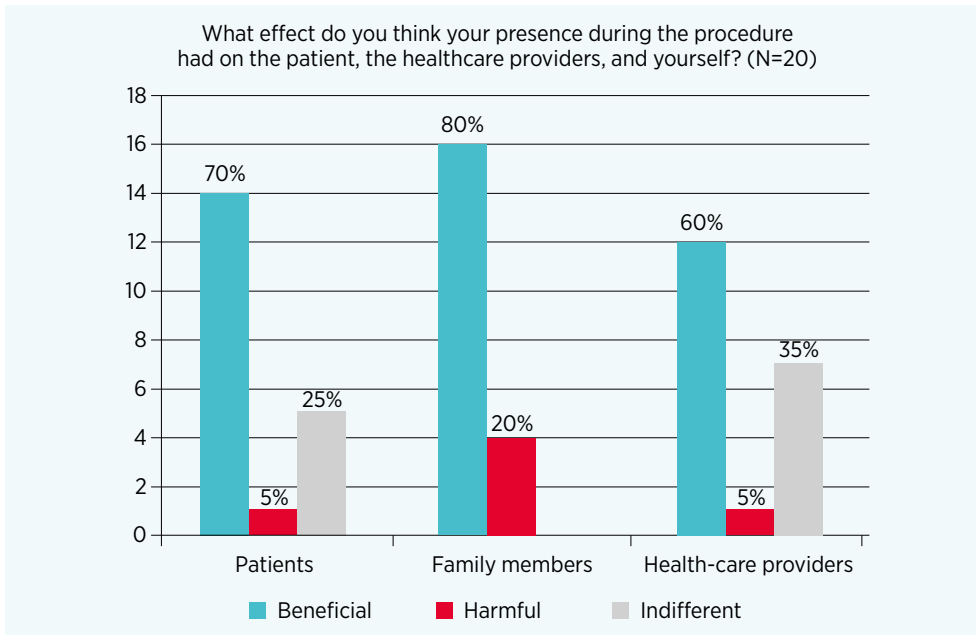


FIGURE 1. Opinion of family members present during the procedure.

The mean age of the parents was 39.3 years (SD 6.6) and they had median of two children (interquartile range [IQR] 1-2). In terms of educational level, 14.8% had completed basic education, 13.6% high school, 37.5% college, and 33% higher education.

Among the physicians, 88.9% were female, with a median age of 28 years (IQR 26-30). Resident physicians predominated (77.8%) with professional experience of less than 5 years (85.2%). The level of experience in invasive procedures, as self-classified by the physicians, was deemed low in 59.3% of the cases. Overall, 31.5% regularly worked in the emergency department.

The mean age of the nurses was 42.9 years (SD 12.2) and the female sex predominated (93.2%). A total of 56.8% had over 20 years of work experience and, in general, they rated their level of experience in invasive procedures as medium-high (90.9%). Overall, 54.5% of the nurses usually worked in the pediatric emergency department.

Among the 44 participating family members, 32 wished to be present during the procedure (72.7%) and this possibility was offered in 27 cases (61.3%). Seven family members rejected this option because they did not want to see the procedure (3) and/or considered that it would be harmful to their child (4). A total of 20 LPs were performed in the presence of a family member (45.5%), most commonly the mother (75%).

When analyzing different procedure-related variables and the sociodemographic characteristics of family members, health care providers, and patients, no significant differences were found regarding family-member presence. In the emergency department, family-member presence was more frequently contemplated than in the inpatient unit (75% vs. 50% of the LP), but this difference did not reach statistical significance (p 0.09).

The opinions of the family members who were present during the LP is shown in Figure 1. In general, they considered their presence to be beneficial for themselves, the child, and the healthcare team. Seventy percent of the respondents believed that the patient was calmer and more cooperative

TABLE 1. Healthcare provider opinion regarding the presence of the family member during the procedure.

What effect do you think the presence of the family member during the procedure had on the patient, the family member, the nurse, and the pediatrician? N=20 nurses and 27 physicians (in 7 cases the intervention of a second pediatrician was necessary to successfully complete the LP)

	Nurses N=20	Physicians N=27	p^a
Patient, n (%)			
Beneficial	12 (60)	18 (66.7)	0.05
Harmful	4 (20)	0	
Indifferent	4 (20)	9 (33.3)	
Family member, n (%)			
Beneficial	11 (55)	22 (81.5)	0.05
Harmful	7 (35)	4 (14.8)	
Indifferent	2 (10)	1 (3.7)	
Physician, n (%)			
Beneficial	4 (20)	12 (44.5)	0.01
Harmful	9 (45)	2 (7.4)	
Indifferent	7 (35)	13 (48.1)	
Nurse, n (%)			
Beneficial	6 (30)	9 (33.3)	0.97
Harmful	4 (20)	5 (18.5)	
Indifferent	9 (45)	13 (48.2)	

^aX².

due to their presence. Four family members (20%) admitted that witnessing the procedure had been unpleasant for them. Overall, 90% of the family members expressed satisfaction and expressed a desire to be present during future procedures. Analyzing the opinion of the family members according to sociodemographic variables, including age, educational level, number of children, etc., showed no significant differences.

Table 1 presents the opinions of the healthcare providers who performed the procedure in the presence of a family member. Approximately 60% believed the presence of the

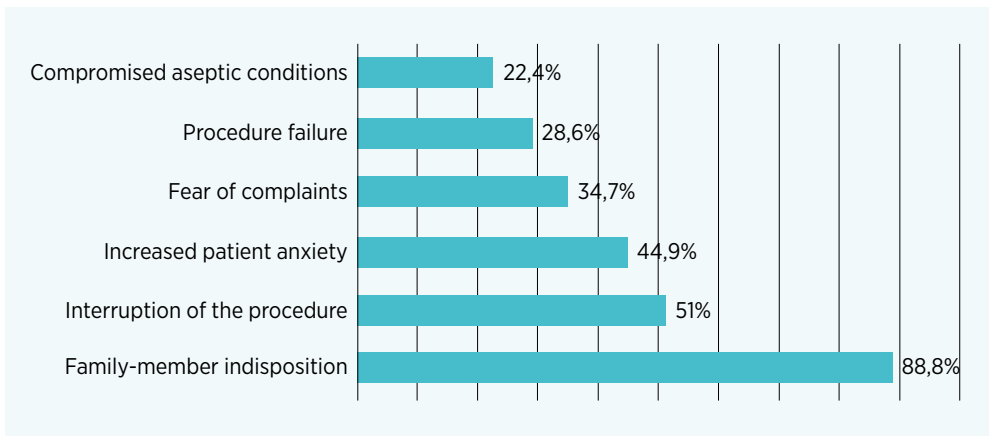


FIGURE 2. Reasons given by the health care providers who did not offer the family member to be present during the LP.

family member was beneficial for the patient, as it resulted in increased calmness and collaboration. Significant differences in opinion were observed between physicians and nurses regarding the impact on the pediatrician in charge of the procedure: 45% of nurses thought that the presence of the accompanying person negatively affected the physician, causing increased nervousness and pressure ($p < 0.01$). Furthermore, 20% of nurses responded that parental presence had had a negative effect on the patient and 55% considered that the effect on the family member was positive, approaching statistical significance. All the physicians and almost 90% of the nurses expressed satisfaction and expressed willingness to perform the procedure again in the presence of the family member.

In our sample, the healthcare providers did not consider the possibility of performing the LP in the presence of the family member in 17 cases (38.7%). The most frequent reasons are shown in Figure 2. Among these family members, 12 (70.5%) stated they would have liked to have been given the opportunity to be present during the procedure.

LP failed in 12 cases (27.2%) and a median of 1.66 attempts were recorded (IQR 1-2). No significant differences were found in the success rate of LP or the number of attempts considering family presence (Table 2). However, a significant difference was observed in age of the patients ($p < 0.03$), with a greater number of successful LPs in younger identified lack of training as the main factor contributing to LP failure, particularly among younger pediatricians (median 26 years, IQR 36-28 vs. median 31 years, IQR 29-38; $p < 0.003$) and those who self-classified their level of experience in invasive procedures as low (81% vs. 0%; $p < 0.005$). The presence of the family member during the procedure was not considered to have influenced the failure of the procedure according to 91.7% of the respondents.

Contaminated LP results were observed in two cases; however, no significant differences were found regarding the presence of parents during the procedure ($p < 0.11$).

DISCUSSION

The desire of parents to accompany their children during certain invasive procedures has been the subject of numerous publications, all of which conclude that parents wish to be present during most of these procedures⁽⁷⁻¹⁰⁾. Boie *et al.* eval-

TABLE 2. Comparative analysis of LP performed in the presence or absence of a family member regarding LP success, traumatic LP result, and number of attempts required.

	Family member present N=20	Family member absent N=24	Total LP N=44	p
Successful LP, n (%)				
Yes	14 (70)	18 (75)	32 (72.8)	0.71 ^a
No	6 (30)	6 (35)	12 (27.2)	
Traumatic LP*, n (%)				
Yes	2 (10)	2 (8.3)	4 (9.1)	0.84 ^a
No	18 (90)	22 (91.7)	40 (90.9)	
Number of attempts (median, IQR)	2 (1-2)	1 (1-2)		0.18 ^b

*Traumatic lumbar puncture: blood in cerebrospinal fluid (red blood cell count > 10,000 per microliter).. ^aX². ^bMann-Whitney U test.

uated the opinion of 400 parents on whether they desired to be present during five hypothetical invasive procedures: venipuncture, laceration repair, LP, endotracheal intubation, and cardiopulmonary resuscitation. The results demonstrated a high interest in witnessing these procedures, which decreased as the level of invasiveness increased; 92.5% of the parents wanted to be present for venipuncture, 86.5% for LP, 80.9% for endotracheal intubation, and 71.4% for resuscitation⁽⁷⁾. This phenomenon, known in the medical literature as the “hierarchy of invasiveness”, has been widely observed to influence the opinion of both parents and healthcare providers^(8,9). As to LP, a procedure considered as moderately invasive, in different studies the desire of parents to be present was found to range from 65% to 80%^(7,8); consistent with the findings in our sample.

Some studies observed significant differences in the opinion of family members related to age⁽⁸⁾ and having witnessed other procedures previously⁽¹⁰⁾; in our sample, however, we did not observe such differences.

At our center, parents were given the option to be present during the procedure in 61% of the cases; however, only 45.5% of the LP were performed in the presence of a family member, which was lower than the rates published in other studies (70-80%)^(9,11). Among all the variables included, differences in parental presence were only found when comparing LP

performed in the emergency department and those in the inpatient unit, approaching statistical significance. This difference reflects a level of acceptance of parental presence by the team of our emergency department, where in recent years parental presence during the entire care process has become a widespread practice.

Most of the parents considered their presence during the procedure to be beneficial for the patient, the healthcare providers, and themselves. They showed a high degree of satisfaction regarding their presence during the procedure and would repeat the experience if another procedure of these characteristics were necessary. These results are in agreement with those reported in the literature^(12,13).

The level of satisfaction among the healthcare providers who performed the procedure in the presence of the parent was also high. Regarding the differences in opinion between physicians and nurses, several studies have reported similar results⁽¹⁴⁾, with the nursing staff being less in favor of parental presence during more invasive procedures. We consider the difference of opinion regarding the negative impact on the pediatrician performing the procedure and the success of the procedure especially relevant, as this opinion that was not shared by the majority of the resident physicians in charge of performing the LP. We believe that this result reflects a change in the mindset of younger physicians, who are increasingly used to involving parents in the care of their pediatric patients and performing procedures in their presence.

In our study, in 38.7% of the cases the healthcare providers did not offer the family the possibility to be present during the procedure. Several studies have analyzed the reasons why health workers are reluctant to allow the family to be present during LP. The most common reason was greater anxiety experienced by both the parents and children, decreased performance of the team, and higher procedural failure rates. In addition, compromised aseptic conditions, interruptions in the procedure, increased risk of complaints, and difficulties in teaching were reported^(5,15,16). The motives of the health care providers included in our sample are in agreement with those published.

Contrary to the beliefs held by healthcare providers, several studies have shown that parental anxiety levels decrease when they witness these procedures, without affecting the anxiety levels of the providers^(4,5). Regarding the behavior of family members, a prospective study found that most of them remained at the bedside calming the patient⁽¹⁷⁾. In our study, the procedure was interrupted momentarily due to the indisposition of the family member in only three cases (6.8%), but no other incidents related to the accompanying person were documented.

We analyzed whether the presence of the family member led to a higher failure rate of the procedure. When comparing LPs where a family member was present with those without an accompanying person, no significant differences in the success rate or the number of attempts required was found. These findings are consistent with those reported by Nigrovic *et al.*⁽¹¹⁾.

With regard to aseptic conditions, we observed no significant differences in the percentage of contaminated results when comparing both groups.

Furthermore, although we did not measure the potential effect on teaching, the high degree of satisfaction expressed by resident physicians, who were in charge of performing the LP in most cases, suggests that the presence of the family member does not complicate the teaching process.

In addition to the limitations inherent to any survey study, our sample size was small, and therefore some differences may not have been significant. Furthermore, the non-anonymous nature of the surveys and the predominant participation of resident physicians who, often were not the ones who decided on family presence, may be a further limitation. On the other hand, the opinion of older children was not collected, which is an aspect that should be considered in future studies.

Based on our findings, we can conclude that, in general, parents wish to accompany their children when LP is performed and that their presence does not increase the risk of failure of the procedure. Additionally, we found a high level of satisfaction and acceptance among both family members and healthcare providers. Nevertheless, we consider that the number of LPs in which family members are offered to be present in our center is still low and, therefore, could be improved.

We have shown that the presence of the family member does not influence the success rate of the procedure, nor does it lead to relevant complications. Moreover, the resident physicians in charge of the procedure in most cases reported not feeling more nervous in the presence of the family member and did not consider it affected the final result of the LP.

We believe that this study provides us with an opportunity for improvement. On the one hand, we expect a progressive change of mindset in healthcare providers in the coming years, abandoning certain biases regarding the presence of parents during invasive procedures in their children. These biases have been shown to be incorrect in previously published studies and ours. On the other hand, as proposed in the study by Fein *et al.*⁽¹⁵⁾ the development of specific guidelines that encourage the presence of family members during invasive procedures could be beneficial for healthcare providers. These guidelines should emphasize mutual decision-making capacity for healthcare providers and family members, training of staff to accompany family members in traumatic situations, predetermination of the number of family members allowed, and the presence of a member of the team dedicated exclusively to the support of the family member. This person, referred to as a “facilitator” in the literature, would have specific training and would be in charge of providing information to the family regarding the procedure, explaining what is expected of them, identifying actions that can aid in the procedure and clarifying actions that may hinder it. They would indicate the appropriate location for the family, assess their reactions, and perform other related tasks⁽¹⁸⁾.

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