

ARTIGO ORIGINAL

# Prolonged Fasting in Paediatric Anaesthesia: Still a Challenge in our Practice? An Audit Study

## *Jejum Prolongado na População Pediátrica: Um Desafio que se Mantém na Prática Clínica? Um Estudo-Auditoria*

Carolina Ribeiro<sup>1,\*</sup> , Mafalda Martins<sup>1</sup> , Cláudia Dourado<sup>1</sup> , Daniela Pinho<sup>1</sup> 

### Afiliação

<sup>1</sup> Serviço de Anestesiologia, Centro Hospitalar Vila Nova de Gaia/ Espinho, E.P.E., Vila Nova de Gaia, Portugal.

### Keywords

Child; Clinical Audit; Fasting; Preoperative Care; Quality Improvement

### Palavras-chave

Auditoria Clínica; Criança; Cuidados Pré-Operatórios; Jejum; Melhoria de Cuidados

## ABSTRACT

**Introduction:** Preoperative fasting has been reviewed constantly. Its main goal is avoiding pulmonary aspiration of gastric contents during anaesthesia. When performed for an excessive period, which is frequently verified, it is associated with adverse events. The present study audits the fasting time in elective paediatric surgery at our institution.

**Methods:** We prospectively audited the fasting duration of all children undergo for elective surgery by the Paediatric Surgery team between 26 March 2021 and 26 April 2021. It was recorded fasting duration for clear fluids, breast milk and solids/formula milk.

**Results:** Fifty-three patients were included, from 1 month to 18 years. All were classified as American Society of Anaesthesiologists physical status I. The average to fasting time was  $9.3 \pm 3.3$  hours for clear fluids and  $9.8 \pm 3.0$  hours for solids/formula milk. More than 50% of patients have at least 10 hours of fasting time for clears fluids.

**Discussion:** In our Institution, paediatric patients fasted much longer than recommended before anaesthesia for elective surgery, possibly related to the trend of ordering nothing per mouth overnight or after midnight, the lack of local protocols, non-disclosure of the worst outcomes underlying prolonged fasting regimens, absence of pre-anaesthetic consultation and possible lack of update to the most recent recommendations.

**Conclusion:** Prolonged fasting times are still a problem in today's reality. Measures are needed to promote its reduction, in accordance with current guidelines. We believe that a contact the day before surgery and the implementation of a multidisciplinary training program can be part of the solution.

## RESUMO

**Introdução:** O jejum pré-operatório visa principalmente evitar a aspiração pulmonar de conteúdo gástrico, tendo sido alvo de múltiplas revisões científicas. A sua realização por um período excessivo é frequente e associa-se a eventos adversos. O presente estudo audita o tempo de jejum em Cirurgia Pediátrica eletiva na nossa Instituição.

**Métodos:** Auditou-se prospetivamente o tempo de jejum em procedimentos eletivos de Cirurgia Pediátrica. Foram incluídos todos os doentes intervencionados entre 26 de março e 26 de abril de 2021, procedendo-se ao registo do período de jejum para líquidos claros, leite materno e sólidos/leite de fórmula.

**Resultados:** Incluíram-se 53 doentes, com idade compreendida entre 1 mês e 18 anos, todos com classificação de estado físico segundo a Associação Americana de Anestesiologistas I. Verificou-se um tempo médio de jejum de  $9,3 \pm 3,3$  horas para líquidos claros e  $9,8 \pm 3,0$  horas para sólidos/leite de fórmula. Jejum  $\geq 10$  horas para líquidos claros foi identificado em  $>50\%$  dos doentes.

**Discussão:** O jejum pré-anestésico identificado na população estudada é largamente superior ao recomendado, possivelmente pela tendência a recomendar "nada pela boca" durante a noite/a partir das 24 horas, falta de protocolos institucionais, desconhecimento do *outcome* negativo subjacente a regimes de jejum prolongado, ausência de consulta pré-anestésica e falta de atualização face às recomendações mais recentes.

**Conclusão:** Tempos de jejum prolongados são ainda um problema na realidade atual. São necessárias medidas que promovam a sua redução, de acordo com as *guidelines* vigentes. Acreditamos que um contacto na véspera da cirurgia e a implementação de um programa formativo multidisciplinar podem integrar a solução.

Autor Correspondente/Corresponding Author\*:

Carolina Romano Ribeiro

Morada: Rua Conceição Fernandes, Vila Nova de Gaia, Portugal.

E-mail: carolinaromanoribeiro@gmail.com

## INTRODUCTION

Preoperative fasting has been recommended since the end of 19th century.<sup>1</sup> During the past two decades, this has been reviewed constantly by the scientific medical community.<sup>2</sup>

The main goal of mandatory fasting is avoiding pulmonary aspiration of gastric contents during anaesthesia.<sup>1,3-6</sup> However, prolonged fasting times are associated with many complications such as discomfort, irritability, anxiety, as well as hypoglycaemia with metabolic acidosis, mainly in children under 36 months, comparing with more liberal fasting regimens.<sup>1-9</sup> In addition, postoperative nausea and vomiting (PONV) are also increased with prolonged fasting.<sup>7</sup> In fact, this leads to negative outcomes.<sup>2</sup>

The traditional guidelines for the management paediatric electives cases recommended a minimum of two hours of clear fluids fasting.

The European Society for Paediatric Anaesthesiology, L'Association Des Anesthésistes-Reanimateurs Pédiatriques d'Expression Française and the Association of Paediatric Anaesthetists of Great Britain and Ireland highlighted the safety of reducing the fasting time for clear fluids from two hours to one hour only.<sup>3,5</sup>

In fact, one-hour clear fluid fasting may not significantly influence gastric volume or pH compared with 2 hours.<sup>3,6</sup>

The usual 2 hours clear fasting strategy results in actual duration of fasting ranging from 6 to 15 hours.<sup>5,10</sup>

Although the Anaesthesia Practice in Children Observation Trial (APRICOT) study highlights the low risk of pulmonary aspiration in children (9/10 000), this type of events can have devastating consequences.<sup>1,3-5</sup>

Scientific research emphasizes the many advantages of reducing fasting times without complications, since the stomach of a child without risk factors for aspiration empties clear fluids within 30 minutes after ingestion or even faster than that, if fluids contain glucose.<sup>5,7</sup> Despite this evidence, many reports have been published advocating unnecessarily prolonged preoperative starvation.<sup>9,10</sup>

In our institution, preoperative anaesthetic consultation is not a routine for all children awaiting elective surgery. Only paediatric patients with important comorbidities are evaluated several days before surgery.

In the other cases, during surgery consultation, parents are given a pamphlet with some information about anaesthetic procedures, which includes written information about recommended fasting times before the anaesthetic procedure. In this way, in order to prevent some of the complications previously described, there is an urgent need to apply these new recommendations.

Our main goal with this work is to audit preoperative fasting times before paediatric surgery in our institution.

## METHODS

We prospectively audited the fasting duration of all children undergo elective surgery by the Paediatric Surgery team during a month period. Data confidentiality was warranted during the entire study. This audit study did not require ethical approval because it was made only the analysis of dataset, where the data are properly anonymized.

This audit study was previously accepted by Ethical Committee from our hospital.

At the time of admission, during preoperative anaesthesia visit, the anaesthesiologist in charge asked caregivers and recorded information about preoperative fasting times (for clear fluids, breast milk, solids/formula milk). Also, age, gender, American Society of Anaesthesiologists (ASA) physical status, and regimen and timing of surgery were recorded.

The time between a child's last oral intake and admission time in operating room was defined as the fasting period. All consecutive paediatric patients undergoing surgical procedures between 26 March 2021 and 26 April 2021 were included. The durations used to determine the adequacy of fasting are listed in Table 1.

## RESULTS

All surgeries were elective and on an outpatient basis. Since all patients were classified as ASA physical status I, none of them went by to anaesthetic consultation. Demographic data was described at Table 2.

During that period, we collected information about 53 consecutive children from 1 month to 18 years. Almost half of the patients were aged between 4 and 12 years.

We found a prolonged fasting time for clear fluids, breast milk and also for solids/formula milk. The mean and the standard deviation (mean±SD) fasting time for clear fluids was 9.3±3.3 hours and for solids/formula milk was 9.8±3.0 hours. More than fifty percent of patients have at least ten hours of fasting for clear fluids.

**Table 1. Durations used to determine adequacy of fasting times<sup>5</sup>**

Clear Fluids	Breast Milk	Solids/Formula Milk
1 hour	4 hours	6 hours

**Table 2. Characteristics of paediatric population during the study**

Characteristics	Number	%	
AGE	≥ 1 month – 6 months	1	2%
	≥ 6 months – 4 years	8	15%
	≥ 4 years – 12 years	27	51%
	≥ 12 years – 18 years	17	32%
GENDER	Male	40	75%
	Female	13	25%

There were only two children (3.8%) with less than four hours of clear fluids intake before surgery. These were two male children, aged 6 and 7 years, both handled in the third surgical stage. There were no patients with shorter fasting periods before anaesthesia during this audit.

Older children were found to have a longer period of fasting (Table 3).

**Table 3. Fasting time distribution by age**

	AGE	Fasting time (mean ± standard deviation)		
		Clear Fluids	Breast Milk	Solids/ Formula Milk
	≥ 1 month to 6 months	-	5.5±0.0 hours	-
	≥ 6 months to 4 years	8.3±2.4 hours	8.0±2.0 hours	8.0±2.4 hours
	≥4 years to 12 years	8.7±3.2 hours	-	9.3±2.4 hours
	≥12 years to 18 years	10.6±2.3 hours	-	11.4±1.8 hours

## DISCUSSION

We found paediatric patients with fasting periods much longer than advocated before anaesthesia for elective surgery. There are some possible justifying reasons behind these prolonged fasting periods.

First, there is still a trend of ordering nothing per mouth overnight or after midnight among health community and professionals involved in the perioperative period.<sup>6,10</sup> On the other hand, the lack of local protocols and the non-disclosure of the worst outcomes underlying prolonged fasting regimens has an important impact. Also, the children did not have pre-anaesthetic consultation.

We assumed that anaesthesiologists with paediatric practice know the new recommendations, the surgeons give the pamphlet with some information about anaesthetic concerns to caregivers and that all staff were informing patients about current fasting guidelines, but we do not know if this was the reality.

We believe that the possibility to contact caregivers in the day before of surgery, could reduce the starvation period, because, in that moment, we could emphasize the importance of drinking clear fluids until 1 hour before anaesthesia. In fact, we could create a protocol promoting clear fluids administration to all children after their hospital admission, until one-hour prior surgery, which in present is not a common practice in our Hospital.

This strategy would minimize fasting times, except for them who undergo surgery at first time. More than stressing the need for respecting strict fasting periods before surgery, it is important to emphasize the need for shortening fasting times to reduce its possible adverse consequences, with other health care professionals and with parents.

To our knowledge, it is the first study in Portugal auditing fasting practices in paediatric anaesthesia. However, our study has some limitations. Indeed, the short period of collecting data, leading to a small size sample, the fact that all of patients have no anaesthetic consultation prior to surgery and underwent day-case procedures, implying that the anaesthesiologist in charge had only the opportunity to be with the patient on the day of surgery, being unable to actively control the fasting period before surgery, are some of the issues that can contribute to these results.

We intend to underline the most recent guidelines on pre-operative fasting in healthy children developed by the European Society of Anaesthesiology and Intensive Care, which are in line with many other paediatric and anaesthesiology communities all over the world. The authors have defined that the new 6-4-3-1 regimen (6 hours for solids, 4 hours for formula and nonhuman milk, 3 hours for breast milk, 1 hour for clear fluids) can be safely recommended for healthy children.<sup>11</sup>

Therefore, it is vital to create a local protocol in line with these new recommendations to promote the implementation of this strategy such as clear fluids one-hour prior surgery and it should be actively disseminated to all professionals involved with patient care. Furthermore, we also suggest the implementation of a phone call on the day before of scheduled surgery to all caregivers in order to highlight the importance of drink clear fluids until 1h before induction.

After the protocol has been established, we suggest performing a new audit, with a bigger sample and the collection of more variables, to evaluate the relevance of the clinical impact of that protocol and to produce more valuable scientific evidence.

## CONCLUSION

We found fasting times for children at our hospital were much longer than that recommended by current guidelines. Based on new evidence, all children without risk factors for pulmonary aspiration, must be allowed and even encouraged to take clear fluids until 1 hour before elective anaesthesia procedures.<sup>11</sup>

Shortening fasting times have a positive impact on children's psychology, metabolism, and hemodynamic status to the anaesthesia period, without increasing risks of pulmonary aspiration.<sup>3,4</sup>

Reducing the mean duration of fasting can be achieved by a clear multi-professional education programme to optimize logistics and spread the new guidelines to all health practitioners that are related to paediatric anaesthesia.

### Ethical Disclosures

**Conflicts of Interest:** The authors have no conflicts of interest to declare.

**Financing Support:** This work has not received any contribution, grant or scholarship.

**Confidentiality of Data:** The authors declare that they have followed the protocols of their work center on the publication of data from patients.

**Protection of Human and Animal Subjects:** The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki as revised in 2013).

**Provenance and Peer Review:** Not commissioned; externally peer reviewed.

### Responsabilidades Éticas

**Conflitos de Interesse:** Os autores declaram a inexistência de conflitos de interesse na realização do presente trabalho.

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**Confidencialidade dos Dados:** Os autores declaram ter seguido os protocolos da sua instituição acerca da publicação dos dados de doentes.

**Proteção de Pessoas e Animais:** Os autores declaram que os procedimentos seguidos estavam de acordo com os regulamentos estabelecidos pelos responsáveis da Comissão de Investigação Clínica e Ética e de acordo com a Declaração de Helsínquia revista em 2013 e da Associação Médica Mundial.

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