UPPER OESOPHAGEAL SPHINCTER FUNCTION

IN INFANTS AND YOUNG CHILDREN

Thesis submitted for the degree of Master of Science

Janet Kathleen Willing B.Sc.
Department of Physiology
University of Adelaide
November 1992

TABLE OF CONTENTS

SUMMARY

Although monitoring of the upper oesophageal sphincter (UOS) with sleeve sensors is a well established technique in adults, there are no paediatric studies using this technique. There are a range of problems affecting UOS function in children, including oesophago-pharyngeal reflux (OPR), a common clinical entity in infants, where UOS monitoring could provide valuable infomation.

This thesis has established a procedure for monitoring of UOS pressure in unsedated children using a sleeve sensor, and the technique was applied to UOS pressure during OPR in children.

UOS pressure was found to be highly labile, increasing markedly with increasing level of arousal of the child. This correlates well with findings in both adults and opossums and refutes the theory that OPR is caused by lowered UOS tone, as there is no one pressure for this sphincter.

The UOS was also found to be reactive to certain stimuli. Distention of the oesophagus by gastro-oesophageal reflux (GOR) increased basal UOS pressure by a small amount (9mmHg). Whilst this was felt to be negligible when the child was awake, it may be enough of an increase to prevent OPR during sleep. Transient relaxations of the UOS occurred with some episodes of distention of the oesophagus due to GOR. These seem the same as the relaxations found in adults. Straining also provoked an increase in UOS pressure, thus protecting against OPR during a period of stress on the sphincter. The response of the UOS to these stimuli was not found to be different in a group of children with symptoms of OPR, when compared to a group without OPR.

In brief, I have established a technique to monitor UOS pressure continuously in unsedated children and advanced knowlege about the responses of the UOS to various stimuli, thus furthering our understanding of the cause of OPR in children.

Declaration of authorship

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any University, and to the best of my knowledge and belief it does not contain any material previously published or writted by another person except where due reference is made in the text.

I consent to this thesis being made available for photocopying and loan.

Janet K. Willing

ACKNOWLEDGEMENTS

I would like to thank my supervisors Dr. Michael Roberts and Dr. Geoffrey Davidson for their advice, encouragement and helpful criticism throughout the project. Prof. John Dent also provided extensive advice on performing the studies, analysis and writing the thesis.

The project was funded by a grant from the National Health and Medical Research Council and undertaken in the Gastroenterology Unit of the Adelaide Children's Hospital. The manometric catheters were supplied by Prof. John Dent. Statistical analysis was supplied in part by Mr Alan Staples.

Finally, thanks must go to my husband, Richard Furler, for his support and encouragement. I am also grateful to my parents for their support, and to my father for 'sharing' the computer facilities for the duration.

List of abbreviations

A-P	antero-posterior
GOR	gastro-oesophageal reflux
LOS	lower oesophageal sphincter
OPR	oesophago-pharyngeal reflux
RPT	rapid pull-through
SPT	station pull-through
UOS	upper oesophageal sphincter

All values are mean $\pm$ standard deviation unless otherwise stated