FLEXIBLE FIBREOPTIC BRONCHOSCOPY IN 582 CHILDREN-VALUE OF ROUTE, SEDATION AND LOCAL ANESTHETIC

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ABSTRACT

The value of route, sedation and local anesthetic was studied in 582 children aged 50 days to 12 years who were subjected to flexible fibreoptic bronchoscopy (FFBS) at the Institutes of Child Health, Madras, during January 1989 to July 1993. Pentax 3.5 mm and Olympus 4.9 mm bronchoscopes were used.

Bronchoscopy was performed with sedation and/or local anesthetic through- nasal/oral route after premedication with atropine. It was successfully carried out through nasal route in 97.4% and only in 40% through oral route. As nasal route proved advantageous, the oral route was later abandoned.

Key words: *Flexible fibreoptic bronchoscope, Sedation.*

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Bronchoscopy has extended the diagnostic and therapeutic capabilities of the physician in adults and children. Indications for bronchoscopy can be diagnostic, therapeutic for preoperative assessment^). Diagnostic indications include cough, wheeze, stridor, hemoptysis, tumor, bronchial obstruction, atelectasis and localized wheezing(2). Therapeutic indications include removal of foreign bodies, removal of secretions in atelectasis and aspiration pneumonia(3). Preoperative bronchoscopy may be done before thoracotomy and lung resection to exclude other unsuspected lesions in tracheo bronchial tree(4).

The flexible fiberoptic bronchoscope (FFBS) offers several advantages over rigid bronchoscope like a more extensive range of view within the tracheobronchial tree, ability to perform the procedure in the treatment room of a hospital or clinic rather than in the operating room, a high degree of safety when performed by trained personnel, and excellent patient tolerance. Technological advances have led to the development of fiberoptic bronchoscopes that are suitable for use in infants and children without general anesthesia(5). This paper gives our experience with fibreoptic bronchoscopy done in 582 children under local anesthesia without sedation.

Material and Methods

Fiberoptic bronchoscopy was carried out in 582 children in the age group of 50 days to 12 years from January 1989 to July 1993. Pentax 3.5 mm fibreoptic bronchoscope was used for children under 5 years and Olympus BFP 20 4.9 mm

was used for children over 5 years. Bronchoscopy was carried out in a bronchoscopy suite with facilities for resuscitation. Two doctors trained in the techniques of bronchoscopy assisted the operator. The patient was fasted for atleast 4-6 hours prior to the procedure. Atropine 0.01 mg/kg IM was given about 30 minutes before the procedure. The procedure was carried out under strict aseptic precautions by either nasal or oral route. In the beginning of the study, FFBS was carried out through the oral route using atomiser spray for anesthetizing the oral cavity. But since we were not successful in many cases mainly due to non cooperation by the patient, we tried adopting the nasal route. This met with tremendous success and hence the oral route was abandoned. When the nasal route was used, 2% xylocaine jelly was applied to the wider nostril and the patient was asked to sniff and about 2 minutes were allowed for the local anesthetic to act. The nostril with a patent passage was chosen prior to the procedure.

After applying 2% xylocaine jelly to the distal 3 inches of the scope which serves both as a lubricant and as a local anesthetic, FFBS was passed into the nasopharynx by lifting the scope near the nares and pushed with a downward pressure. Tn case of oral route, the scope was passed through the mouth guard (bite block) into the oropharynx(6). The pharynx, epiglottis and vocal cord were then visualized and anaesthetized by spraying 2% xylocaine with polythene cannula inserted through the suction channel by the technique, "spray as you go"(7). A minute after instillation of the local anesthetic on the vocal cord, the bronchoscope was gently passed through the glottis into the trachea. The trachea and bronchi were also anesthetized by spraying xylocaine as the scope was advanced. The cannula was withdrawn after instilling xylocaine over the carina. To avoid contamination from upper respiratory tract, suction was not used through the bronchoscope until it was passed beyond the carina. A quick inspection of the bronchial tree of the normal side was undertaken followed by inspection of the affected side. Bronchoalveolar lavage was done wherever indicated. The bronchoscope was wedged in a segmental bronchus with pathology and bronchoalveolar lavage carried out in three aliquots by injecting normal saline (2 ml/kg) through the working channel(8,9). AH specimens were sent for cytological and microbiological analysis(l0,11). In patients with compromised pulmonary function, oxygen was administered by nasal cannula through the free nostril. Chest skiagram was performed a day prior and a day after bronchoscopy.

Results

FFBS was done in children with the following lesions collapse/consolidation, bronchiectasis, persistent pneumonia, hemoptysis, congenital anamolies (aplasia, hypoplasia), stridor, evaluation after tracheostomy and interstitial lung disease.

There were 347 male and 255 female children. The age and sex distribution is shown in *Table I.* Most of the children (88%) were above 3 years of age. Sixteen were below one year of age and the youngest was a 50 day old infant with pulmonary hypoplasia.

The nasal route had several advantages *(Table II)*. The oral route was abandoned because of practical difficulties.

Bronchoscopy was successfully carried out through the nasal route in 508 (97.4) children and could not be performed in 12 (2.6%). When the oral route was used, the success rate was 24 (40%) and the failure rate was 34 (60%).

Discussion

All children in the present study were under 12 years of age, the youngest being a 50 day old infant with pulmonary hypoplasia. Wood also has performed bronchoscopy in 8 children from 0-1 year. Jan *et al.* (12) performed bronchoscopy in a newborn, one week of age. In Woods' series in 1978, all scopies were done transnasally. The major exception was with the 2.5 mm fibreoscope which must be introduced through an endotracheal or tracheostomy tube(13). In this series, 3.5 mm fibreoscope was introduced into endo-

TABLE I—*Summary of Technique in Relation to Age and Sex Distribution*

Age	Children studied				Nasal	Oral
	M	F	Total	(%)		
0-3 mo	2	2	4	(0.69)	2	2
4-6 mo	4	2	6	(1.03)	3	3
7-12 mo	5	3	8	(1.37)	5	3
1-3 yr	30	22	52	(8.93)	46	6
4-6 yr	56	73	129	(22.17)	107	22
7-9 yr	106	100	206	(35.40)	193	13
10-12 yr	90	87	177	(30.41)	166	11
	293	289	582	(100.00)	522	60

TABLE II—*Comparison of Nasal and Oral Route*

Nasal	Oral
* Procedure tolerated well	* Children more agitated
* Scope unlikely to be damaged	* Scope more likely to be damaged
* Easy to visualize vocal cord	* Angle of approach to larynx more difficult
* Child can swallow secretions and cough	* Difficulty in swallowing and coughing
* Scope is well positioned	* Position of scope frequently changed with tongue movements

tracheal tube in three children with post operative collapse after cardiothoracic surgery. Harrell has performed more than 3000 producers using transnasal approach and only in 2 patients it was unsuccessful. In our series 89.7% (522) of cases were done through nasal route with only 2.6% failures.

The transnasal approach is safe, well tolerated and offers a diagnostic and therapeutic yield equal to that obtained when intubation is added to the procedure(14). The only contraindication to its use is a nose that is completely obstructed by either trauma or disease(15). Till a decade ago, pediatric bronchoscopy has usually been done with a rigid bronchoscope with general anesthesia. Technological advances have, however, led to the development of small flexible fibreoptic bronchoscopes that are suitable for use in infants and children without general anesthe-sia(15-!7). In the present series, all 582 cases were scopied with local anesthetic only. In only 78 cases, prior sedation was givne and the rest were done without sedation. There is no appreciable advantage of sedating children for bronchoscopy. On the other hand, if sedation is not given these children are able to swallow or spit out secretions. Since the child is alert and awake it is easy to monitor vital signs and observe the altered physiological features like cyanosis and bronchospasm. Further, the vocalization of child during the procedure increases the confidence of the bronchoscopist. During the procedure, even the uncooperative child who resents and resists the procedure initially becomes quite the moment the scope enters the trachea. Cough will persist if the tracheo-bronchial passage is not well anesthetized.

Hence FFBS is a simple, safe and useful procedure, which could be performed transnasally without sedation under local anesthesia.

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