

An audit of fiberoptic bronchoscopy service at KRL Hospital Islamabad

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ABSTRACT

Background: Fiberoptic bronchoscopy is an important diagnostic and therapeutic tool for a wide spectrum of thoracic disorders in interventional pulmonology. The British Thoracic Society published comprehensive guidelines in 2001 on the use of fiberoptic bronchoscopy. The purpose of this audit was to evaluate the performance of our bronchoscopy service in the light of these guidelines with a view to identify areas for further improvement.

Methods: In this prospective audit a series of 50 consecutive bronchoscopies performed at KRL Hospital Islamabad was studied. For each examination we recorded patient demographics, indication of the procedure, radiological information, pre-procedure evaluation by the pulmonologist, the bronchoscopic appearance and histopathological and microbiological findings, where indicated, and any untoward events associated with the procedure.

Results: The mean age was 48.8yrs (SD±17.9) with male predominance (M 78%, F 22%). The main indication of the procedure was sampling of bronchial washings for microbiological assessment (n=25; 50%), followed by evaluation of suspected malignancy (n=15; 30%), hemoptysis (n=9; 18%) and persistent cough (n=1; 2%). Chest X-rays were abnormal in majority of patients (n=46; 92%) and radiological appearance of pulmonary mass lesion was seen in 24% (n=11) of abnormal CXRs. Thirty percent (n=15) of bronchoscopies were abnormal with 93% diagnostic yield of specimens obtained for histopathological assessment. A low diagnostic yield of 24% was observed in cases of specimens collected for microbiological assessment. No major procedure related complications were observed during or after the procedures.

Conclusion: Fiberoptic bronchoscopy is a safe procedure provided all basic precautions are taken. The procedure should be considered in all patients with a mass lesion on CXR. Although the histopathological diagnostic yield was well above the recommended standard in cases of endoscopically visible malignancy but a low diagnostic microbiological yield was observed especially in cases being evaluated for tuberculosis. The latter may be attributed to less selective study population and sub-optimal microbiological service. Hence the audit was useful in identifying an area for further improvement. In a developing country, like Pakistan, gender bias is rampant even when it comes to access the healthcare facilities.

Key words: Laparoscopic cholecystectomy; Spinal anesthesia; General anesthesia; Cost.

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INTRODUCTION

Fibreoptic bronchoscopy (FOB) is an important diagnostic and therapeutic tool for various respiratory conditions.¹ It is widely used to establish or exclude the diagnosis of bronchial carcinoma.² Its utility has further increased because of high microbiological diagnostic yield from bronchoalveolar lavage (BAL) in pulmonary infections, especially in immunocompromised patients.³

The British Thoracic Society (BTS) published comprehensive evidence based guidelines on the use of FOB in 2001.⁴ Guidelines not only describe patient and staff safety measures but also lays down the standards of performance of diagnostic techniques. The patient and staff safety requires adequate manpower with proper training of both the bronchoscopist and the nursing staff, careful selection of the patients and their continuous monitoring throughout the procedure. The guidelines also describe the recommended diagnostic yield of biopsies, brushings and washings in cases of endoscopically visible malignancy. Other areas covered by the guidelines include contraindications, complications and precautions of the procedure, requirement of sedation and anaesthesia/analgesia, and cleaning and disinfection of the instruments including glutaraldehyde usage.

In modern practice, all aspects of medical performance, particularly the invasive procedures, should be subjected to regular audit. A properly performed medical audit is an essential tool for upgrading the quality of healthcare system.⁵ The purpose of this audit was to assess the performance of our bronchoscopy service in the light of the above guidelines with a view to identify the areas in need of further improvement.

METHODS

This prospective audit was done at medical department of KRL General Hospital Islamabad, from June-December 2009. After departmental approval, informed consent was obtained from the subject patients. Our department has a video endoscopy unit, Olympus Video-bronchoscope BF-160©, which is used by both the pulmonologist and the gastroenterologists. Bronchoscopies are performed on both indoor and outdoor patients by the pulmonologist. In a small group of patients in Intensive Care Unit (ICU), bronchoscopies are performed with the co-operation of an experienced anaesthetist.

A series of 50 consecutive bronchoscopies done at KRL Hospital, Islamabad were included in the study. A standard performa was designed for data collection. For each

examination, we recorded patient demographic data, indication of the procedure, clinical and radiological information, pre-procedure evaluation by the pulmonologist, bronchoscopic appearances and histopathological and microbiological findings (where indicated), and any untoward events associated with the procedure.

All patients had pre-bronchoscopy evaluation by the pulmonologist which included clinical assessment and spirometry and/or oxygen saturation measurements where indicated. The procedure was fully explained to the patients in their native language. All, but one, procedures were done under local anaesthesia (lignocaine gargles and endobronchial instillation of 2% lignocaine, the total dose used not exceeding 5ml) with light sedation with midazolam 1-1.5mg IV. One procedure was done in ICU where patient was paralysed and was being mechanically ventilated. Bronchoscope was inserted via endotracheal tube in this one patient (2%), oral route was used in the remaining 49 (98%) patients. All patients were monitored by pulse oximetry and received supplemental oxygen during the procedure.

The bronchoscopic appearances were described as normal, mild inflammation/ulcer, probably malignant, definitely malignant but no frank tumour, or frank tumour as described in literature elsewhere with little modification.⁶ Complications e.g. bleeding, severe bronchospasm, hemodynamic variations or psychological signs of severe distress necessitating interruption of the procedure were noted. Data was analysed using statistical software SPSS version 13.0 for Windows (SPSS Inc. Chicago, IL USA). Discrete variables were listed as counts or percentages and continuous variables were listed as means with SDs.

RESULTS

The mean age was 48.8 years (SD \pm 17.9) with significant male predominance (M:F 39:11). Regarding the indications of the procedure, the largest number of procedures were performed to obtain bronchial washings for microbiological assessment (n=25; 50%); followed by evaluation of suspected malignancy (n=15; 30%), haemoptysis (n=9; 18%) and persistent cough (n=1; 2%) respectively. CXR was abnormal in majority of the patients (n=46; 92%) and radiological evidence of a pulmonary mass lesion was observed in 24% (n=11) of abnormal CXRs.

In general 30% (n=15) of bronchoscopies were abnormal and the specific abnormalities seen are shown in Table 1.

Table 1: Various bronchoscopic lesions seen

Lesion Seen	Frequency
Frank Tumour	7 (47%)
Definitely Malignant (No frank tumour)	1 (7%)
Probably Malignant	2 (13%)
Inflammation/Ulcer	5 (33%)
Total	15 (100%)

In patients with CXR findings of a mass lesion the corresponding bronchoscopical appearances almost always suggested a malignant lesion as shown in Table 2.

A 93% histopathological diagnostic yield was achieved in procedures with abnormal bronchoscopic findings, and this yield approached 100% where the lesion appeared definitely malignant bronchoscopically. The overall diagnostic yield of specimens collected for microbiological sampling was 24% and it was 20% in cases being evaluated for tuberculosis.

The procedure was well tolerated and completed without any major complication in almost all of the patients. Only one patient (2%) encountered a minor complication comprising of <50 ml blood loss. Post procedure advice (verbal/written) was offered to all of the patients before being discharged from the endoscopy unit in line with the guidelines.

DISCUSSION

In this comprehensive audit some interesting results were obtained which are in accord with the disease patterns and cultural norms of a low-income developing country. A low number of female patients (22%) underwent bronchoscopy as compared to males. This observation is reflective of gender bias in physical, social, cultural and spiritual well-being in the developing countries. Women frequently experience bias in access to the quality health services in these countries.^{7,8} Pakistan lags far behind most developing countries in women's health and gender equity, standing 107th out of 174 countries in the United Nations Development Programme Gender-related Development Index and 71st out of 102 countries in Gender Empowerment Measurement.^{9,10} Men out-number women in Pakistan¹¹ and the low female literacy rate (35% as

Table 2: CXR Abnormality and Bronchoscopic Findings Crosstab

Lesion Seen	CXR Abnormality		Total
	Mass Lesion	Other	
Frank Tumour	7	0	7 (14%)
Definitely Malignant (no frank tumour)	1	0	1 (2%)
Probably Malignant	2	0	2 (4%)
Inflammation/Ulcer	0	5	5 (10%)
Normal	1	34	35 (70%)
Total	11 (22%)	39 (78%)	50 (100%)

P=0.001

compared to 57% in men)⁹ further contributes to the above observation.

In our study the main test indication was collection of specimen (bronchial washings) for microbiological assessment. This is in contrast to the situation in the developed world where suspected lung malignancy is the commonest indication.^{3,6} However, this corresponds well to the high prevalence of infectious or communicable diseases in the developing world. The World Health Organization (WHO) in 2004 issued an update on 'global burden of disease' which highlighted lower respiratory tract infections, HIV/AIDS and tuberculosis (TB) as the leading causes of death in low-income countries while ischemic heart disease, cerebrovascular accident and tracheal/bronchus/lung cancers as the leading causes of death in high-income countries.¹² Within the above group, the majority (80%) of the specimens were taken to confirm TB. This is in keeping with high burden of TB infection in our country. WHO ranks Pakistan as sixth highest TB endemic country in the world with estimated incidence rate of 181 cases per 10,000 persons or 272,000 new cases annually.¹³

We observed a low microbiological yield of bronchial washings in our study, which is in contrast to various national and international studies showing bronchial washings AFB smear positivity ranging from 50 to 90%.¹⁴⁻¹⁷ There may be multiple reasons for the abserved difference. Firstly, the above studies were done primarily to evaluate the microbiological yield of bronchial washings, while it was not the primary aim of our study. Obviously the study population in these studies comprised of highly selected cases with strong clinical and radiological suspicion of active TB. On the other hand our study population was less selective and comprised of a good number of cases with

previously treated TB infection where FOB was done to rule out reactivation of disease. Hence, less AFB smear positivity can be expected in our study population as compared to highly selected population of above mentioned studies. Another reason for this low microbiological yield could be a lack of full time consultant microbiologist in the pathology department in the initial half of the study period; we did notice a relatively high microbiological yield in the later part of our study when a full time microbiologist was employed in the pathology department.

The overall histological yield of bronchial specimens, where endobronchial abnormality was seen, was 93% and it increased further where the lesion was classified as definite tumour during bronchoscopy by the pulmonologist. The above yield is well above the minimum recommended standard (85%) by BTS guidelines.⁴

CXR was abnormal in majority of the patients (n=46, 92%) and the radiological appearance of a mass lesion on CXR corresponded well with the bronchoscopic suggestion of a malignant lesion. Similar results have been reported by Su WJ et al.¹⁸ in the literature and they concluded by saying that FOB should be considered in any situation where the CXR shows a mass lesion of 4cm or greater in size.

FOB is a safe procedure provided basic precautions are taken.¹⁹ The complications of FOB described in literature can be divided into major and minor⁴; major (life threatening) complications including respiratory depression, pneumonia, pneumothorax, airway obstruction, cardio-respiratory arrest, arrhythmias, and pulmonary oedema, whereas minor (non-life threatening) complications, in order of frequency, include vasovagal reactions, fever, cardiac arrhythmias, haemorrhage, airway obstruction, pneumothorax, nausea and vomiting. The complication rates associated with FOB described in literature include mortality rate 0 – 0.04%, major complication rate 0.08 – 0.5% and minor complication rate 0.1 – 0.8%.²⁰⁻²⁵ In our study, all patients completed the procedure safely with no mortality or major complication. Only one patient had minor haemorrhage (<50 ml blood loss) which did not require any special intervention. Hence FOB is found to be a safe procedure by our study as well. Our results show that qualified and experienced laboratory staff is essential for the results to be authentic and reliable.

CONCLUSION

Fibreoptic bronchoscopy is a safe procedure provided all

basic precautions are taken. The procedure should be considered in all patients with a mass lesion on CXR. Although the histopathological diagnostic yield was well above the recommended standard in cases of endoscopically visible malignancy but a low diagnostic microbiological yield was observed especially in cases being evaluated for tuberculosis. The latter may be attributed to less selective study population and sub-optimal microbiological service. Hence the audit was useful in identifying an area for further improvement. In the developing countries like Pakistan, gender bias is rampant even when it comes to access to the healthcare facilities.

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