8. LIMITATIONS OF Ph. D. THESIS

A. Inability to incorporate some of the more promising and newer bio-markers

With the increasing pace of investigation in the otherwise fascinating field of endoscopic surgery, certain newer bio-markers like pro-inflammatory mediators (IL-1, IL-6, IL-18, and HMG-1(high mobility group protein), etc.) and anti-inflammatory mediators (cytokine IL-10, etc.) are proving more promising for evaluating surgery-induced systemic stress responses. Some of them have been recently established as more dependable and their inclusion in the present study would have provided valuable data on assessment of the surgical stress in relation to our local population with possible therapeutic modulations for better quality of patient care and favourable clinical outcome. This limitation was knowingly accepted at the design level of the present study because of the fear of non-feasibility of too costly newer investigations in our secondary care government-aided teaching hospital with limited resources and facilities.

However, at this time of completion of the present study, I find the thrust and enthusiasm of the present Vice-Chancellor of the University currently targeted towards better quality of research work and hope that this resource crunch for the quality research work may not be a major limiting factor in recent future at our institution catering mainly patients belonging to the uneducated poor socio-economic class.

B. Problem of non-application of newer technologies for biomarker estimation

Newer technology like DNA microarray analysis which has become the standard of the time for validation of data, is currently not available at our institution and hence could not be utilized in the present study. As a bio-marker may be expressed in minimal or subtle concentrations too difficult to detect easily and accurately, and its biological half-life may be very short like less than a few minutes, the usefulness of the data varies in direct proportion to the care with which they have been obtained and to the precise use to which they are put as emphasized long back by Bravo and Tarazi (1982) and Derbyshire and Smith (1984).
LIMITATIONS OF Ph. D. THESIS

A little older technology of High Pressure Liquid Chromatography (HPLC) or Polymerase Chain Reaction (PCR) available at the Agricultural Institute of the University, where major portion of the present laboratory work was carried out, could not be timely utilized for verification of ELISA-based results due to some non-technical reasons. Application of these techniques in a newly designed study may give more insights into the surgical stress response.

C. Inability to incorporate certain more groups of patients in combination with GA (General anaesthesia)

Addition of neuronal blockade such as epidural analgesia or splanchnic nerve block, or peri-incisional local anaesthetic infiltration in the present study would have provided invaluable data on therapeutic modulations of the surgery-induced stress for our local population. This limitation was knowingly accepted because of the fear of non-feasibility of too much prospective research work against the background of the perpetual resource crunch made palpable to us all the time.

D. Laparoscopic abdominal hysterectomy

This procedure is not yet being performed at our institution and therefore could not be included in the present study although its inclusion would have definitely contributed towards better understanding of surgical stress and its modulations. This limitation was out of our control and is currently persisting.

E. Problem of sampling beyond 1-2 day in LC group

Since our society is still a traditional one with ingrained psychology on the concept of discharge from the hospital after removal of the stitch(es) and apprehensive reluctance on the early discharge, sampling beyond post-operative day 1-2 was not a problem after lap cholecystectomy in majority of our patients as they happily stayed post-operatively for four days required for the present study. But sampling beyond post-operative day 1-2 was a definite problem in a few patients after lap cholecystectomy who were not ready to stay in the hospital post-operatively beyond day 1-2 as they did not have any complaint/problem related to the procedure, and who were finding it difficult to attend the follow-up clinic on the very 4th post-op day.
LIMITATIONS OF Ph. D. THESIS

I strongly feel after-wise about this aspect of the study design because this is going to be one of the major limitations in future with better pre-op education and counselling to the patients and adoption of the relevant multimodal approach of Kehlet (1997) for favourable clinical outcome. I wonder why this aspect did not receive any attention, what to talk of due attention, in prospective controlled randomized studies available in the literature. It is a pity that even Henrik Kehlet (1997) so enthusiastic about his enlightening model approach failed to address this over-due issue – continuance of study until 7th post-op day (Changes in stress factors continue postoperatively for 7 days as documented as early as 1985 by Lennard associates) even when patient goes home or even to work before that time.

F. Different timings and number of sampling as well as the inequality of the sample sizes

Various studies available in the literature carried out sampling with timings and numbers for biomarkers’ estimations, and this has created difficulty in the comparison and interpretation of our results with them. Furthermore, inequality of the sample size is also an important issue and this should be chosen after doing power of analysis by a statistician as was done in the beginning of the present study. Only then reasonable comparison will be possible and recorded conflicting data if any will generate credibility and inspiration for more research to improve the quality of patient care and surgical outcome.

Therefore, development of an international protocol for measurement and evaluation of surgery-induced systemic stress responses will be a really fruitful exercise that will not only translate into improved quality of patient care and favourable clinical outcome but also provide an impetus for improving the research orientation in developing countries where main thrust still lies in serving the already stressed people with the available bare resources and facilities.

G. Problem of Biochemical Lab outside Operation Theatre (OT) premises

I felt a small but definite problem of Biochemical Lab situated outside Operation Theatre premises for preparing and storing samples as well as measuring the biomarkers in terms of transport delays and dependency on the staff of the other department.
I strongly felt the need of establishing an advanced Biochemical Lab within the OT premises fully equipped with the infrastructure, trained technicians and a clinical Biochemist and that too under control of the Department of Anaesthesiology, so that avoidable delays and dependency on the staff of the other department are eliminated, and more importantly, more anaesthetists will be tempted and encouraged towards objective evaluation of post-surgical course and clinical practice of evidence-based medicine for improvement of the quality of patient care and favourable outcome. Such a proposal has already been put forward by our department.

H. Problem of perception of Doctoral research activity as personal work

At some crucial points during the conduct of the present study, I was made to realize by some of my influential colleagues that this is purely my personal work and that what benefits the department will derive if my research work is assisted by the University financially or otherwise for completion. Thus this perception became a limiting factor for earlier completion of the present work. I failed to understand this logic academic work as a purely personal work. I believe that growth of a department of even an institution is directly linked to the academic activities of the individual faculty members and students. Therefore, it cannot be overemphasized that there is a definite place, especially in the developing countries, for education of medical fraternity of all ranks and files regarding research orientation and its due recognition for uninhibited overall growth, individual as well as institutional, of international standard required for the state of the art quality of patient care to achieve the everybody’s goal of the best possible clinical outcome.

I am of the opinion that research orientation at a given level definitely sends positive signals down the line with intellectual inspiration at least in contemporary and junior colleagues as well as in the students who are more receptive to imbibe the work culture when moulded suitably in a positive manner.

I. Problem of doing research activity in off-duty hours, especially by faculty member

I, a consultant anaesthetist in a government medical college, have carried out this clinical doctoral research work while doing my routine and emergency hospital duties and teaching assignments all the same. As the research laboratory in the department of
Anaesthesiology is still in the proposal status, I performed all my ELISA-based measurements of the biomarkers in advance laboratory of another department of our University.

As the laboratory of Department of Agricultural Microbiology fully equipped with facility and personnel especially trained in ELISA testing under charge of a clinical Bio-technologist is situated about 2 Kms away from our hospital, it was a little compromising as well as taxing for the to-and-fro movements feasible only during off-duty hours and holidays when the lab used to open for the uninhibited continuous research work. This proved, in addition to the financial limitations, another major factor for completion of the present study in about 4 years' time.

J. Large volume of present thesis as a limitation

Last but not the least, I find it a little disturbing that the present work has become more voluminous than the usual size that may prove a limitation of the present Doctoral Thesis on two counts. One, the present work might give a feeling that it has incorporated a lot of unrelated or unnecessary material which in reality is not the case, and may dissuade a scholar to go through it, thereby hindering dissemination of pertinent information. Second, the present work, first of its kind in the Department of Anaesthesiology, may send a negative signal to junior colleagues and students for opting such a strenuous higher Doctoral work and qualification, thereby making the whole exercise counterproductive as far as research orientation is concerned to pursue the current trend of evidence-based medicine, at least in anaesthesia and surgery.