PAEDIATRIC NEPHROLOGY SERVICES IN SRI LANKA – A JOURNEY FROM INFANCY TO ADOLESCENCE

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Introduction

My interest in renal disorders began during my internship at the Renal Unit of the National Hospital of Sri Lanka, under the supervision of Dr. Suresh Ramachandran. Due to the constraints of manpower at that time, I had the blessing of getting much needed hands on experience in renal procedures while still an intern house officer. This was further strengthened during surgical internship at the Professorial Unit where I developed a desire to manage renal transplant patients, as it was the only transplant centre in existence in the country at that time. With this background I started my career in paediatrics as a Registrar in Paediatrics at Teaching Hospital, Peradeniya, where I was given a free hand to perform procedures and carry out research on renal disorders by my supervising consultants. Even though I had a deep desire to become a paediatric nephrologist, my ambition was not realized as the Postgraduate Institute of Medicine did not recognize paediatric nephrology as a subspecialty at this juncture, and my hopes were temporarily suspended. However, while in training in the United Kingdom I continued my quest to be trained as a paediatric nephrologist. The research work I had performed in Sri Lanka5,7 and the good references I had obtained, helped me to secure a Clinical Research Registrar post in Paediatric Nephrology at the Great Ormond Street Children’s Hospital (GOSH), University College London, United Kingdom (UK).

The main responsibilities of this post were to carry out research by investigating many aspects of nephrotic syndrome (NS) under the expert guidance of Dr. Richard Trompeter, Prof. Michael J. Dillon, Dr. William van't Hoff and Dr. Lesley Rees, all extremely eminent personalities in paediatric nephrology. I attended courses in statistics, research protocol development and human resource management to improve my profile as a researcher. The research I conducted in investigating many aspects of nephrotic syndrome have been presented in international scientific forums such as the British Renal Association, International Pediatric Nephrology Association and the Royal College of Paediatrics and Child Health6-10 and published in many international journals such as Paediatric Nephrology, Expert Opinion on Pharmacotherapy, Archives of Disease in Childhood and the Lancet14-20.

In addition to the research work, I conducted two out patient clinics per week, provided advice for regional hospitals on management issues for children with nephrotic syndrome and did on-calls with the renal registrars. I received a wealth of experience in managing diverse renal problems during my stay at the Great Ormond Street Hospital as it was the largest paediatric transplant unit in the UK.

BACKGROUND

At present we witness many changes in medical education and training in order to cater to the growing needs of the medical profession and the society as a whole. In the higher education arena the trend is to move towards student-centered learning, where students are encouraged to take responsibility for their learning and professional development. Hence learners are provided with opportunities to personalize learning experiences.

Furthermore, General Medical Council, UK in its recommendation advocates the development of professional attributes such as active learning, critical thinking and reflective practice among trainees1. Portfolio is an attempt to encourage the development of such attributes among health professionals. In this approach, the learner is made to identify his/her learning needs through reflection, and is encouraged to pursue self-directed learning. More importantly, the portfolio writing exercise allows learners to learn aspects which are relevant to their day to day work in a meaningful way.

EDUCATIONAL THEORY

Malcom Knowles12 in describing Andragogy, ‘the art and science in helping adult learning’, recommended that those involved in teaching adults follow the guidelines stated below:

- Involve learners in diagnosing their own needs as such acts will help to trigger internal motivation
- Encourage learners to formulate their own learning objectives—this gives them more control of their learning
- Encourage learners to identify resources and devise strategies for using the resources to achieve their objectives
- Support learners in carrying out their learning plans
- Involve learners in evaluating their own learning—this can develop their skills of critical reflection.

The portfolio development process is known to have incorporated the stated principles of adult learning into instruction and assessment with much success. In this background, portfolio-based learning has gained momentum in all stages of Medical Education, namely, undergraduate, post graduate and continuing professional development.

WHAT IS A PORTFOLIO?

Davis and Ponnamperuma describe it as ‘a collection of work of a learner, which provides evidence of achievement of knowledge, skills, attitudes, understanding and professional development through a process of self-reflection over a period of time13’. Stated below are two of the available definitions of a portfolio4.
“A collection of papers and other forms of evidence that learning has taken place”, “It is a purposeful collection of student work that exhibits the student’s efforts, progress and achievements in one or more areas. This collection represents a personal investment that is evident through the student’s participation in the selection, the criteria for judging the merit of the collection and the student’s self-reflection.”

In summary, portfolio is both a powerful learning and assessment tool, which is capable of capturing students’ learning in action. Key elements of a portfolio are the learner experiences and the reflections made on one’s actions. The reflections steer the learning process as well as the evidence of learning.

**Educational advantages of portfolios**

Portfolios are advertised as the instrument par excellence to enhance integrated, self-reflective, self-directed, longitudinal learning. It enables assessment of achievement of most of the program outcomes, specifically competencies such as self-regulated and lifelong learning and professional development. Like many complex skills, self-reflection is probably best learned by doing and preferably over an extended period of time. One of the highlighted strengths of this method is the process of introducing portfolios as part of learning and assessment in the post graduate programs. Since development of a portfolio depends on learners’ experiences and guided reflection, it is also an ideal tool to be used for continuing professional development and revalidation purposes.

**Process of learning**

Portfolios encourage learners to learn more through their own experiences. According to Kolb, the experiential cycle starts with one’s own experience, followed by the reflection one makes about the specific situation (Figure 1). The subsequent step of the process involves planning action, putting into action, and evaluating the outcome. The experiential cycle is then repeated.

**Use of portfolios in medical education**

Many medical schools, for example, Faculty of Medicine Dundee, UK, Maastricht Medical school in the Netherlands, University of New South Wales, Australia, JIPMER, Pondicherry, India and International Medical University, Malaysia use portfolio as a means to train and assess undergraduate medical students.

With respect to postgraduate education, the Royal College of Physicians and Surgeons of Canada introduced a learning portfolio, to create opportunities for personal learning. Not only in the West, the Postgraduate Diploma in Medical Education conducted by the Postgraduate Institute of Medicine (PGIM) Colombo is portfolio based. It is heartening to note that in keeping with the trend, most of the boards of study at the Postgraduate Institute of Medicine (PGIM) Colombo is portfolio based. It is heartening to note that in keeping with the trend, most of the boards of study at the Postgraduate Institute of Medicine (PGIM) Colombo is portfolio based. It is heartening to note that in keeping with the trend, most of the boards of study at the Postgraduate Institute of Medicine (PGIM) Colombo is portfolio based.

**Notable references**

tuberculous appendicitis and three of them were associated with either peritoneal or ileocecal tuberculosis. In the West, Yersinia infection has been recognized as the commonest infectious cause of granulomatous appendicitis. Furthermore in Western countries, most of the “previous idiopathic” appendicitis cases are considered to be either due to Yersinia infection or idiopathic. Crohn disease is no longer recognized as a common cause of granulomatous appendicitis and isolated Crohn disease in the appendix, without the involvement of the rest of intestinal tract, is no longer considered a cause. It is now accepted that, in countries where tuberculosis is non endemic, the majority of granulomatous inflammation in the appendix is due to prolongation of the acute inflammatory process associated with interval appendicectomy or due to recurrent attacks of acute appendicitis. In our series, only two cases fulfilled criteria of interval appendicitis (recurrent attacks). Of the females who underwent appendicectomy 0.5% had endometriosis. All, except one, did not have associated acute appendicitis, indicating that the abdominal pain in these women may have been due to endometriosis.

**Conclusions**

The main unexpected findings in the appendices were the neoplasms, granulomatous inflammation and endometriosis. These findings were consistent with those of the rest of the world. The commonest unexpected finding in the appendicectomy sample was primary malignant tumours (0.3%) and the commonest malignant tumour group was mucinous neoplasms (low grade appendical mucinous neoplasms and mucinous adenocarcinomas). The majority of the tumours were incidental findings. Secondary adenocarcinoma was the commonest pathology in the appendices of colectomy specimens. As observed in other tuberculosis endemic countries, the commonest cause for granulomatous appendicitis was tuberculosis.

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**Author Contributions**

DLPD, KD and DNKB collected data and performed literature survey; SW and DLPD analyzed the data and wrote the paper; SW and NVIR performed the histological analysis of appendiceal neoplasms.

**References**


**Figure 1. Kolb’s learning cycle**

Learning process is identifying gaps in knowledge, skills or attitudes as the case may be. This leads to the next step, which is to draw up a plan to achieve the identified gaps in learning. Thinking of many options and prioritizing, selecting what should be done in the given context. The learner then executes the plan in order to accomplish the set goal. Later the portfolio entry is completed with reflection on the entire process and accumulating evidence to show how he/she has accomplished his or her plan. In addition, learners are also encouraged to record failures and possible reasons as to why it is so. May be those become a learning experience for the second cycle, eventually resulting in a spiral.

**What kind of material could be included in a portfolio?**

It could be printed or electronic material that could be considered as evidence of actual work carried out by the student/trainee such as:
- Case reports
- Best essays
- Published work, research reports
- Awards and certificates of participation in seminars, conferences etc.
- Letters of recommendation
- Log book entries on practical procedures undertaken/ performed
- Completed evaluation forms - Self, peer, Mini Clinical Examination (MiniCEX) feedback forms, patient satisfaction records
- Video tapes of consultations

**What do the learners and examiners say about portfolio based learning and assessment?**

Literature on student perceptions of portfolio development process indicate that at undergraduate level, students are concerned about the high load of paper work which they have to manage along with their clinical training.

Nevertheless, according to a study carried out in the International Medical University (IMU), Malaysia, although students have reported that the portfolio development
Desirable learning and assessment tool for undergraduate students at JIPMER, Pondicherry, India following the use of portfolio based learning and assessment in community based fieldwork.

A recent review of literature on educational effects of portfolios on undergraduate student learning concluded the main educational benefits as improvement in knowledge and understanding, increased self-awareness and engagement in reflection and improved student-teacher relationships.

It is believed that with a good induction program and careful planning of its content, portfolio has great potential for high quality learning. Supervisors play a crucial role during the mentoring process and it seems to be extremely demanding at times with increasing numbers of students. Nevertheless, Portfolio ensures workplace based learning and a more holistic assessment of the trainee.

Examiner perceptions of portfolio over a three year period carried out at the University of Dundee has revealed that portfolio process provides a holistic picture of the candidate and with adequate briefing of the co-examiner could agree upon the student grade, ensuring validity and reliability of the assessment tool.

A recent review by Dreissen reported quite good inter-rater reliabilities of portfolio assessment, which is contrary to the widespread belief that portfolio assessment is ‘subjective’. Results were also encouraging regarding the combined use of portfolios for learning and summative assessment.

It can be concluded that portfolio is a desirable learning and assessment tool for professional courses of study and revalidation purposes.

**Practice points**

- Portfolio implementation has to be well designed and sustained with high level organizational support for greater effectiveness
- A flexible learner-centered format is preferred over a highly structured format as it could have a positive educational impact on learners
- A well orientated and committed mentor would enhance effective learning
- Summative assessment of portfolio contents can be reliable with multiple raters; however, it may be desirable to triangulate with other sources of assessment.

It is advised that those who plan to introduce portfolio-based learning and assessment organize a good induction program for students and staff both. Such a measure would allay anxiety among trainees and pave the way for promoting lifelong learning among health professionals.

**References**


3. Davis MH, Ponnamperuma GG. Portfolios, projects and dissertations in Dent, JA and Harden RM. A practical guide for portfolio implementation has to be well designed and sustained with high level organizational support for greater effectiveness. Nevertheless, Portfolio ensures workplace based learning and a more holistic assessment of the trainee.

Coexistence of mucinous neoplasms of appendix with similar lesions in the ovary has been reported in many studies. While some argue that these are synchronous independent tumours, the currently favoured opinion is that almost always these are primary appendiceal tumours with metastatic deposits in the ovary. In our series, none of the mucinous tumours had a detectable ovarian pathology.

Mucocele of the appendix is a common gross manifestation of mucinous neoplasms. However, mucocele is a descriptive term used for a distended appendix filled with mucus and could have a non-neoplastic aetiology as well. In our series, all mucoceles were associated with mucinous neoplasms, two LAMNs and one mucinous adenocarcinoma and the other was a non-neoplastic retention mucocele. The other gross manifestations of mucinous neoplasms, in our series, included two adenocarcinomas as masses and one adenocarcinoma and one LAMN as irregular thickening of the wall. In one adenocarcinoma, inflammatory features were predominant and in the adenoma appendix was grossly unremarkable.

However, LAMN has also been reported in grossly unremarkable appendices. The mean age and the female predominance in mucinous neoplasms in the present study are consistent with the published literature.

The most common neuroendocrine tumour type in the appendix is NET G1 (carcinoid tumour) which has low grade malignant behaviour with a low risk of metastasis. As observed in our series, these tumours are often incidental findings in younger age groups. The frequency of NET G1 in appendicectomy specimens range from 0.02-0.09% [12-15]. In our series, all neuroendocrine tumours were NET G1, the frequency of which was 0.1% and constituted 23% of all primary appendiceal tumours. All were incidental findings in externally unremarkable appendices.

Apart from acute inflammation, the benign conditions encountered in our series were granulomatous inflammation and endometriosis. Granulomatous inflammation was present in 0.2% (7/2907) of appendicectomy specimens. Prevalence of granulomatous inflammation is known to vary geographically, it is 0.4% in a Western country, 0.3% in a Middle Eastern country and 2.4 to 2.9% in a South Asian country [16-19]. Causes of granulomatous appendicitis include infectious causes such as tuberculosis and Yersinia, interval appendectomy, Crohn disease, foreign body related, idiopathic and sarcoidosis. The aetiology of granulomatous appendicitis too shows geographical variations and in endemic regions tuberculosis is a common cause and is the reason for higher prevalence of granulomatous appendicitis [16-19]. In some series from India, almost all cases of granulomatous appendicitis had a histological picture consistent with tuberculosis. In our series, 57% 4/7 had...
None had synchronous ovarian tumours or secondary tumour deposits elsewhere. The mean age of the patients with mucinous neoplasms was 54.5 ± 14.05 years and 7 (78%) were females.

All neuroendocrine tumors present were NET G1 (carcinoid tumors) and they were incidental findings in appendicectomy specimens performed for suspected acute appendicitis (Table 1). The mean age of patients with carcinoids was 21.3±0.6 years and 2 (66.7%) of them were females.

Of the appendiceal tumours of the colectomy specimens, 7 were secondary carcinomas, of which 5 were direct invasions of caecal adenocarcinoma while two were deposits from adenocarcinoma elsewhere in the colon.

Of the primary tumours, three were mucinous adenocarcinomas while the other was a sessile serrated adenoma.

Discussion

The most common pathology in appendicectomy specimens was acute inflammation and this was the only pathology in 69% specimens (Table 2). In colectomy specimens, acute inflammation was present only in 11.8% (Table 3). Acute inflammation of the appendix is commonly precipitated by factors that increase its intraluminal pressure, such as mucosal lymphoid hyperplasia in children, faecaliths, tumours and parasites. Therefore, acute appendicitis could be a secondary manifestation of the incidental lesions. Even in the absence of inflammation obstruction of the appendicular lumen can produce colicky pain mimicking acute appendicitis.

The most important group of unusual findings in the appendicectomy sample is primary appendiceal malignancies which had a prevalence of 0.3% (Table 1). In published series the frequency of primary appendiceal malignancies ranged from 0.1% to 1.4%. In the colectomy specimens there were 3.2% with primary appendiceal malignancies. All malignancies in our series were of epithelial type and included, 5 adenocarcinomas, 3 LAMN and 3 NET G1 (carcinoid tumors). Of these tumours, 73% (8/11) were incidental findings during surgery or detected at pathological examination of appendicectomy specimens of patients suspected of acute appendicitis. The rest were present in colectomy specimens performed for right iliac fossa mass and exploration of an anterior abdominal wall sinus (Table 1).

Malignant mucinous neoplasms, which comprised 23% LAMN and 38.5% adenocarcinoma, were the largest primary tumour group in this series. In many published series mucinous neoplasms were the commonest group of primary appendiceal tumours2,3. The main complications of appendiceal mucinous neoplasms are pseudomyxomaperitoneii (PMP) and distant metastasis.

PMP is described as accumulation of mucin and mucinous epithelial cells within the peritoneal cavity secondary to peritoneal spread of a mucinous neoplasm. PMP is most commonly due to spread from an appendiceal mucinous neoplasm and very occasionally from mucinous carcinoma from other sites, especially from colon2,6,7.

When PMP is associated with ovarian mucinous neoplasms, almost always the primary tumour is present in the appendix2,8. Low grade PMP is usually associated with LAMN and high grade PMP with appendiceal mucinous adenocarcinoma. Twenty percent prevalence of PMP had been reported among those with appendiceal mucinous neoplasms and the risk was highest for mucinous adenocarcinoma and lowest for medical teachers (2nd ed). Elsevier Churchill Livingston, 2005: 346-356.


