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特別寄稿

Physician Assistant (PA) Training in the United States - with a Surgical Emphasis

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While most of the first organized programs to train physician assistants (PAs) in the United States were focused on the acute shortage of manpower in the primary care disciplines, (Duke University 1965, and the University of Washington 1969 in primary care, and the University of Colorado 1965 in pediatrics), there was a parallel interest in training non-physicians in surgery at the same time.

John Kirklin MD, a renowned cardiovascular surgeon, developed a program to train assistants in surgery in 1967, at the University of Alabama. He recognized that former military corpsmen and surgical technicians, who already had considerable training and experience managing trauma patients in the Korean and Vietnam Wars or in civilian US hospitals, could perform much of preoperative and postoperative care. He worked with the American College of Surgeons to develop a statement of "Educational Essentials" for his training program. The American Medical Association (AMA), which was already directing its "Educational Essentials" toward the primary care disciplines of internal medicine, pediatrics and family medicine, expanded its focus to embrace the surgeon's assistant. Dr. Kirklin, in turn broadened his program to include training in internal medicine and pediatrics.

Jack W. Cole MD and Alfred M. Sadler Jr. MD followed these models and developed a broad based PA Program located in the Department of Surgery at Yale University School of Medicine in 1970. They combined a nine-month core of basic and clinical sciences with 15 months of clinical preceptorships, much like those that medical students received. In fact, the PA students at Yale, were trained along side medical students and house staff (interns, residents and fellows). Thus the principles of team based learning and care, were established from the outset in each of these programs.

The first postgraduate program for physician assistants in surgery was established in 1971, at the Montefiore Medical Center in the Bronx, NY by surgeons Marvin Gliedman and Richard Rosen, with the assistance of Clara Vanderbilt PA, an early graduate of the Duke PA Program. Two years later, a postgraduate training year in surgery for graduate PAs, was developed at Norwalk Hospital, CT - an affiliate the Yale Department of Surgery and the Yale PA Program.

Before formal training programs for PAs in surgery were established, there were notable examples of "informal arrangements" where surgeons trained their own. In the 1930's Charles Higgins, MD hired and trained Eddie Rogers to be his "medic" in Urology, at the Cleveland Clinic. As an assistant to Dr. Higgins, Rogers became adept at performing therapeutic procedures to treat urological problems. Later, a brilliant young man, named Vivien Theodore Thomas, was hired as a surgical research technician, by Cardiovascular Surgeon Alfred Blalock, MD at Vanderbilt University and in the 1940's helped to develop the procedures used to treat "the blue baby syndrome". Only informally trained by Dr. Blalock, he nevertheless became a pioneer in and eventually a teacher of cardiac surgical technique with Dr. Blalock at Johns Hopkins University. Although Thomas had no formal educa-

tion or degree, and never personally treated a patient ; for his exceptional research and teaching abilities, he was awarded an honorary doctoral degree from John Hopkins in 1976.

By 2014, an increasing number of PA Residency Programs in Surgery or in Surgical Subspecialties have developed as well as a specialty PA Society entitled the American Association of Surgical Physician Assistants (www.aaspa.com). There are five programs, which offer additional training for PAs in Orthopedic Surgery, ten in general surgery and one in the Neurosciences.

Another notable evolution, is that the National Commission on Certification of Physician Assistants (NCCPA) recently prepared examinations (2012-2014) which recognize excellence in specialty areas - now numbering seven. One is in cardiovascular - thoracic surgery and another is in orthopedic surgery (www.nccpa.org). This is in recognition of the growing need for PAs to demonstrate competence in these areas. The NCCPA's 2012 survey of PAs in the United States revealed that approximately 23% are practicing in surgery or in surgical subspecialties.

In order to qualify to sit for the certification examination for added qualification, the PA candidate must have documented 2,000-4,000 hours in the field. As of this writing, 36 PAs have received the Certificate of Added Qualification in Cardiovascular and Thoracic Surgery and 78 PAs have received the CAQ in Orthopedic Surgery.

Ⅰ. Brief History of the PA Profession in the United States

Historically speaking, a crucial development in the nationwide acceptance of PAs, was the decision by the National Board of Medical Examiners (NBME) to develop an examination for the Assistant to the Primary Care Physician. This was the first time that this independent organization, which tests medical students, interns and resident physicians in collaboration with specialty boards, had ever tested non-physicians. The first nationwide examination for Physician Assistants was administered to 880 candidates in December 1973. Candidates were graduates of approved PA Programs or Nurse Practitioner Programs. The exam consisted of multiple choice questions and patient management problems.

The following year (1974), an independent National Commission (NCCPA) was formed with 14 supporting organizations represented on the Board. Thomas E. Piemme MD of George Washington University was elected as the first Chairman. The Commission's charge was to address eligibility and standards for the NBME examination, and to assure state medical boards, employers, and the public of the competency of PAs. More than 100,000 PAs have been certified by the NCCPA over the past forty years. A certified PA is designated PA-C.

Equally important to the testing and certification of individual PAs, is the development of an effective accreditation process for assessing the competency of training programs. The American Medical Association (AMA), which had decades of experience in credentialing other "allied health" professions took the lead and in 1971 convened a committee made up of PA program directors and representatives of appropriate specialty medical societies to develop "Educational Essentials" for training programs. The following year, a Joint Review Committee was formed and accreditation of programs began, with the financial support of the federal government. The Accrediting agency - now entitled the Accreditation Review Commission on Education For the Physician Assistant (ARC-PA), has become a freestanding organization that continues to be made up of nine "sponsoring organizations". See www.arc-pa.org for details.

Presently, there are 190 PA Programs, which have achieved active accreditation status. Another 60 Programs are in the queue to be considered for accreditation.

Ⅱ. Qualifications of Candidates for PA Programs

In the United States, PA Programs found at the outset, that it was important for candidates to have had at least two years of patient care experience, so that program directors could feel confident that the candidate would be comfortable dealing with sick patients.

Therefore the candidate pool drew from experienced military corpsmen, other health disciplines such as nursing, surgical technicians, and respiratory therapists among others. Initially, Programs awarded certificates to graduates but over the years, in part to keep up with other professions that are offering advanced degrees, most PA programs now award the Master's degree. As the PA profession has become widely known and accepted in the US, many programs have reduced the requirement for candidates to demonstrate prior patient care experience in favor of a stated commitment to enter the health field. Nearly all candidates now must have a Bachelor's Degree to enter a PA Program, and thus be eligible for the Master's Degree upon graduation from the very rigorous 24 to 27 month long program.

Ⅲ. Acceptance of PAs by Physicians and the general public in the United States

Even before the first formal PA Programs were piloted, Charles Hudson, MD, a leader in and eventual President of the American Medical Association (AMA) recognized the value in the utilization of PAs in American Medicine. He advocated the concept at national AMA meetings and in a landmark article in the Journal of the American Medical Association (JAMA), in April 1961. Dr. Hudson had extensive personal experience in WWII, with US military corpsmen who helped save many soldiers' lives on the battlefields, as well as care for the wounded and assist physicians and surgeons and military hospitals.

The first PA program leaders (Stead, Silver, Smith, Kirklin and Myers among others) recognized the crucial importance of obtaining support from physicians and organized medicine, if PAs were to be accepted and utilized. Early Program leaders went to great lengths to get local physicians on board. Richard Smith MD established the PA Program in Seattle, WA by canvassing the state and held "town meetings". He called this effort "establishing a receptive framework", which he insisted was essential to the smooth incorporation of a new health worker into our health care system. This type of activity has been followed by others and has been crucial to acceptance elsewhere.

The concept of the PA was also written about in newspapers and popular magazines, with individual stories of Physician-PA teams helping to sell the concept. After nearly fifty years of working in the United States, PAs are accepted and functioning effectively in nearly every discipline in health care.

Ⅳ. State Licensure Requirements

Licensure for all of the health professions in the United States is governed by the fifty individual states. When PAs first emerged in the late 1960s, the analysts (Ballinger, Estes, Sadler and Sadler) who examined the alternatives for licensure for PAs, arrived at a simple and effective approach. Their recommendation was to amend the Medical Practice Act of each State, to specify *that a physician could delegate certain functions and tasks to a specially trained assistant, as long as those tasks fell under the scope of the physician's practice and both the physician and PA were responsible for the care administered*. This created great flexibility for the practice and is one of the reasons that the Physician-PA partnership has worked so well over the ensuing decades. As the team works together, the PAs role can expand as appropriate. Many states added a regulatory dimension to the amendment to the medical practice act. As such, the Medical Board of the state, typically enunciated guidelines for practice and supervision. Today, PAs are practicing in all fifty states and licensure has evolved to explicitly allow PA prescription authority as well as other important aspects.

Ⅴ. Supervision of Physician Assistants

Supervision of PAs follows a diversity of patterns in practice, depending on the nature and location as well as the number of years that the PA has worked in the practice. When the physician and PA work essentially side by side in an office or clinic setting, or in the case of assisting in surgery - supervision can be direct. When a PA is practicing at a remote site, as often happens in rural areas, where the population base may be small - then supervision can be by telephone or through the advancing technology of telemedicine.

Senior PAs frequently assume leadership roles and supervise other PAs. This is especially true in large centers like the Cleveland Clinic, which employs more than 400 PAs across a broad array of specialties.

In training programs, much of the teaching is now being done by experienced PAs with the supplementation of physician input as appropriate. All programs have Medical Directors. In the programs that are based in Academic Health Centers, PA students are trained along side medical students. In their clinical rotations, PAs are trained with interns and residents. Although there is much talk these days in the US about "team based care" as being a new concept and an ideal to aspire to, PAs have been taught in this model since the 1960's and 1970's. As such, although PAs continue to work legally under the supervision of the physician, they have a great deal of "functional autonomy".

VI. The Other Pillars of the PA Profession

In the United States, PA Program Directors early on realized that they needed to organize and share common concerns, learn from each other and to represent the PA educational community on the accreditation and certification Boards. The educational organization, now known as the Physician Assistant Education Association (PAEA) was founded in 1972, and recently celebrated its 42nd year. One of its first tasks was to hold an annual meeting - the first of which was convened in 1973 and was sponsored by the sixteen existing Programs www.paea.org and the American Academy of Physician Assistants (AAPA), representing graduate PA's. www.aapa.org. The annual meetings, which are held throughout the US, have grown to an average attendance of 5,000 or more and include a heavy dose of Continuing Medical Education as well as organizational and business sessions.

In surgical training programs, PAs are taking on roles formally occupied by surgical residents and fellows. They are involved in pre and post operative care of surgical patients and assist at surgery. Because of the mandatory reduction in the maximum number of hours that surgical house staff are allowed to work each week, there has been a corresponding increase in the number of PAs serving as faculty and support personnel in cardiovascular surgery, orthopedic surgery and general surgery physician training programs. Many Professors of Surgery depend on PAs to keep their residencies and fellowships viable.

VII. Distinguished Physician Assistants

PAs have distinguished themselves in many ways. Dana Gray PA-C is an example. A former military corpsman, he subsequently received his PA training at Case Western Reserve University. Over the course of his more than thirty years of work in cardiovascular surgery, he has cared for patients in the office of his supervising physician; Jonathan Hill MD and has managed trauma patients in the hospital. Together they received the AAPA Physician-PA Partnership Award in 2012. Gray is one of the pioneers in the harvesting of veins and is credited with performing the first vein procedure using an endoscope.

Another stellar PA working in a highly technical field is Lyle Larson, PA-C, PhD who is in charge of implanting many of the pacemakers in patients at the University of Washington hospital. He also plays a major teaching role, in the training of cardiology residents and fellows there.

At the UC Davis Medical Center in California, Ed Ranzenbach, PA-C and J. Nilas Young, MD, chief of cardiovascular surgery, work as a seamless team performing complicated procedures involving the esophagus, lungs, chest wall and heart. Dr. Young states that PAs "extend our workforce capabilities in the clinic, the ICU and on the wards. They free up the surgeons to do more complicated tasks". See www.nccpa.net for more information.

Outside of surgery, there are ten PAs serving as part of the medical team at the White House. Karen Bass PA-C has been elected twice to the United States Congress from California; Mike Milner PA-C has reached flag officer status within the US Public Health Service, with equivalent rank of Rear Admiral in the US Navy. There are countless examples of PAs exceling in important clinical and leadership roles in the community and in academic positions.

Ⅷ. International PA Programs

PAs are being used internationally in developed and underdeveloped countries. In the Netherlands, five PA Programs celebrated their tenth anniversary this year. Programs are also functioning in England, Scotland, Canada (Manitoba and Ontario), Australia, South Africa, Ghana, India and Germany. A new program has been developed specifically for the military services in Saudi Arabia. A PA program, sponsored by the Royal College of Surgeons, is scheduled to open in Ireland in early 2016. Each pilot, demonstration, and program opening has been accompanied by a structured evaluation strategy that has informed subsequent development. Ruth Ballweg MPA, PA-C of the University of Washington, is one of several PA leaders from the United States, who has devoted time and expertise to help these programs develop effectively. PAs have also volunteered in many underdeveloped and underserved countries including those struggling to combat the Ebola virus epidemic in 2014.

Ⅸ. The Physician Assistant History Society

Visionary, Reginald Carter PhD, PA, a long time leader of PA training at the Duke University PA Program, established a Society devoted to archiving and documenting the history of the profession in 2002. The PA History Society's website www.pahx.org is a rich repository of information. The Society is a nonprofit supporting organization of the NCCPA, based in Atlanta and is run by a purely voluntary Board made up of PAs, Physicians and others with knowledge of and a commitment to the history of the profession. A small and committed staff at the headquarters in Atlanta handles the crucial day-to-day matters. The Society has begun a five year collaborative project with the National Library of Medicine, to prepare traveling exhibits, that will be available to schools, libraries and organizations to tell the story of PA history, beginning in our 50th anniversary year-2017. Four leading members of the Society, reviewed the history of the profession in their recent book -*The Physician Assistant : An Illustrated History,* which is available for a nominal price through the above website.

Ⅹ. Lessons from the United States that are universal and therefore may be helpful as Japan considers the education and training of physician assistants

Because Japan has a centralized, national health system, it will not face the issue of individual State (Prefecture) licensure, as the United States has done. Four pillars will be essential to develop : first a rigorous national system of accrediting programs, second a national certification examination for graduates, third, an organization of PA programs and fourth, an organization of PA graduates. In all of these activities - collaboration with appropriate physician leaders, health organizations and the government will be essential. A selected bibliography follows at the end of this article. Please consult the aforementioned websites for additional details and information that is beyond the scope of this review article.

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