INTRODUCTION AND AIM OF THE WORK

INTRODUCTION

Percutaneous interventional procedures using radiological guidance are commonly performed and have become an integral part of the diagnostic and therapeutic armamentarium of radiologists. In concert with the continued growth and advancement of cross-sectional imaging, recent years have seen further development and refinement of interventional techniques and instrumentation, and improvements in cytopathologic evaluation. As a result of these advances; imaging-guided procedures such as percutaneous biopsy and abscess drainage have become widely accepted as safe, accurate, and effective alternatives to more invasive surgical procedures, fluoroscopy, sonography, computed tomography (CT), and magnetic resonance imaging (MRI) all can be used to guide these procedures, the imaging method chosen depends on multiple factors, including lesion size, location, and visibility, the patient's medical condition, the personal preference, previous experience, and skill of the radiologist, and the relative cost and availability of the guidance methods ***(Charboneau, 1990)***.

Fluoroscopy is relatively inexpensive and readily available, and it provides adequate guidance for many lung ***(Westcott, 1990)*** and skeletal ***(Kattapuran, 1991)*** procedures, procedures, large mediastinal and hilar masses ***(Westcott, 1990)***, and lesions identified in conjunction with contrast studies such as cholangiography, pancreatography, angiography, and lymphangiography, also can be accurately sampled with fluoroscopic guidance ***(Hooper, 1993)***. Most percutaneous interventional procedures in the abdomen and pelvis, however, are best performed with sonography or CT guidance which provide superior direct lesion visualization and three-dimensional information ***(Gazelle, 1990)***.

Sonography is readily accessible and portable, allowing interventional procedures to be performed at the patient's bedside. It provides real-time multiplanar imaging and continuous monitoring of needle position in a manner similar to fluoroscopy ***(Charboneau, 1990)***. Ultrasound also can be easily combined with fluoroscopy by performing of the procedures within and interventional suite, which is particularly helpful when multiple fascial dilatation and drainage catheter placement are required. Ultrasound's capability of real-time imaging in virtually any plane offers and advantage over CT in guiding nontransaxial needle trajectories, permittingmany procedures to be accomplished more quickly than with CT. Ultrasound also is less expensive and uses no ionizing radiation. However, sonographic guidance generally is limited procedures on relatively superficial structures, particularly in obese patients, because sound attenuation in soft tissues makes deep lesion visualization difficult. Lesions within or deep to bone or air-filled lung or bowel also cannot be adequately visualized because of the nearly complete reflection of sound from bone or air interfaces. Furthermore, sonographic guidance has limited applicability in patients with surgical guidance had limited applicability in patients with surgical dressing and draining wounds ***(Gazelle, 1990)***.

Computed tomography provides precise, three-dimensional localization of lesions and surrounding structures, even in patients with external dressings, open wounds, ostomies, or other devices or pathology affecting the skin surface. Computed tomography allows imaging of bowel (air) and bone, as well as orally and intravenously administered contrast agents, oral contrast material aids differentiation of an abscess cavity from normal bowl. Enhancement from intravenous contrast material provides and assessment of lesion vascularity and delineates nearby vascular structures.

The anatomic detail provided by CT enables precise planning of percutaneous access routes for biopsy and/or drainage. The superb spatial resolution also permits exact needle-tip localization within lesions, even those smaller than 1cm in diameter, thus, small structures can be biopsied or aspirated with a high degree of accuracy and low risk of complications ***(Mueller, 1990)***.

Another advantage of CT as an interventional guidance technique is its versatility. Because a complete 360-degree view of the patient is provided, multiple entry points, approach angles, and potential needle pathways can be selected, patients positioning can be changed to create safer, more advantageous access routes, and to maximize patient comfort. Additionally, a wide variety of biopsy and drainage devices can be used ***(Paul, 1998)***.

Although CT is extremely informative and versatile, CT-guided procedures do have several disadvantages, they require expensive scanning equipment and are more costly and time consuming than procedures guided by fluoroscopy or ultrasound. Computed tomography also is relatively less available for guidance purposes at most institutions, because of an often demanding, high-volume, diagnostic CT examination schedule. Other drawbacks include limited access to patients because of the CT gantry, and the lack of continuous monitoring of needle insertion and guide wire or catheter manipulation. To address these limitations, some manufactures offer CT scanners with a wider opening between the table and the gantry, which allows placement of a C-arm for combined CT-fluoroscopic guidance ***(Costello, 1993)***. In most cases, however, the direction and depth of intervention can be estimated reliably with conventional CT scanners alone, with minimal need for needle or catheter repositioning ***(Paul, 1998)***.

Generally, CT is used to guide interventional procedures only when fluoroscopic or sonographic guidance is unsatisfactory, lesions readily demonstrated by conventional radiographs (e.g., lung or skeletal lesions, or gas-filled abscess cavities) are approached whenever a lesion (e.g., a predominantly cystic lesion) and a safe access route can be imaged clearly with sonography. Not infrequently, sonography is combined with fluoroscopy and assisted by CT, thus extending the indication for either fluoroscopic or sonographic guidance. For example, after review of the CT scans and selection of an entry site and pathway to a lesion, a fluoroscopic and/or sonographic study is performed to assess to chosen access route. If the access route is appropriate, the needle or catheter is then inserted under fluoroscopic or sonographic direction. Such a complementary approach using multiple methods of guidance often allows complex biopsies and drainages to be performed safely and effectively ***(Paul, 1998)***.

Computed tomography is used primarily for guidance of procedures involving anatomic areas such as the retroperitoneum and pelvis. When lesions are small (< 3 cm in diameter) or located next to major vascular structures, when avoidance of bowel loops is important (e.g., in immunologically compromised patients) and for any lesion that is not clearly demonstrated by either ultrasound or fluoroscopy. Complete tomography is also when initial attempts with other forms of imaging guidance have falied ***(Paul, 1998).***

The preliminary development and use of MRI for direction of percutaneous international procedures has been described in a number of reports. However, clinical experience with interventional MRI is still very limited. This is largely because in its present state of development it is costly, cumbersome, and time consuming, and it does not have significant advantages over sonography or CT as primary interventional guidance technique. It is possible that as future MRI systems offer faster imaging times, improved physical access, and more versatile instrumentation for biopsy and drainage, MRI guidance my develop wider application, particularly for lesions that are seen either exclusively or better by MRI than by other imaging techniques ***(Van Sonneberg, 1989).***

AIM OF THE WORK

This study aims to evaluate the practical accuracy, validity of the CT-guided percutaneous biopsy and aspiration-drainage techniques of abdomino-pelvic masses and fluid collections.