Achieving Quality Embalming Results in an Obese Case

The experience of caring for a person weighing 300-800 pounds or more from removal to final disposition will undoubtedly tax your physical stamina, professional dedication as well as your embalming skills. We have been made keenly aware of the increasing problem of obesity in the American population by the media. According to some statistics, two-thirds of the U.S. population is overweight either due to a medical condition or by simply not following an appropriate diet and exercise regimen.

While the obese person is living they are able to assist caretakers with transporting their body, moving from one exam table to another, etc. It is left up to the embalmer or funeral director and whomever else they can find to help them to move the body. This process can be taxing and frustrating to the embalmer and the funeral director. Routine procedures and techniques are no longer considered “normal” when working on an obese person. These routine procedures and techniques become substantially harder. Alterations must be made in order to achieve maximum quality results. What follows are a few techniques to help in the embalming process.

Body Position on the Table

By elevating the body 12-18 inches above the table the extra-vascular pressure within the thoracic cavity and the heart will be reduced. The reduction in this pressure will allow better circulation of the arterial fluid and more effective drainage will be achieved. In elevating the

body in this manner the carotid artery will be easier to find since the fatty tissue will gravitate inferiorly.

Injection Site

In general it is easier to find the carotid artery in an obese person. With its size and accessibility the carotid artery is a prime site for injection. There can be found relatively small arteries in a person who has been obese from childhood. However, if the person became obese later in life, you may find the arteries to be remarkably larger.

Concentration of Arterial Fluid

It is important for the embalmer to do a careful pre-embalming analysis of the condition of the body and the history surrounding the cause and mechanism of death. The answer to these questions will help determined the strength of the embalming solution. If there is found to be edema or trauma to the body a “waterless” method may perform better than the standard. Many manufacturers have developed a satisfactory waterless chemical that provide a good alternative for preserving the body. It is always wise to increase the strength of the injection solution if you are in doubt. Then there will be no doubt about any problem with the body during viewing.

Volume of Arterial Solution

In general, it is recommended to use one gallon of arterial solution for every 50-75 pounds of body weight.

Injection Pressure

There is an intense extra-vascular pressure naturally present in the obese case. To overcome this it may be necessary to use a high level of injection pressure with in intermittent rate of flow. Also, this will aid greatly in the profusion of the arterial chemical into the deep muscle tissue. By using an internal dye generously you will enhance your ability to see the diffusion of the arterial fluid. Actually visualizing the fluid is a much better indication of the presence of arterial fluid than digital palpation of the tissue.

Drainage

Restrict the drainage periodically during the injection to allow the vascular system to completely fill. This will minimize the effect known as "short circuiting" of the arterial chemical.

Aspiration

Ironically, the thoracic cavity of an obese person is usually not significantly larger than a normal body. Some embalmers use massive amounts of cavity fluid on the obese case. This may not be necessary. The justification for using more cavity fluid is the assumption that the thoracic cavity on the obese person is significantly larger than a normal body. However, in nearly all cases, the thoracic cavity of an obese person is not much, if any, larger than that of a thinner person.

When large volumes of cavity chemical are placed in a small cavity this can precipitate purge problems. If higher index cavity chemicals, such as 50 index are used then, in the majority of obese cases, 16 ounces of concentrated 50 index in the thoracic and 32 ounces in the abdominal

cavity will sufficiently preserve the internal organs. Additional concentrated chemical may be necessary if the abdominal cavity is extremely large, or if problems due to decomposition are present.

Considerations for the Preparation of Tissue Donors

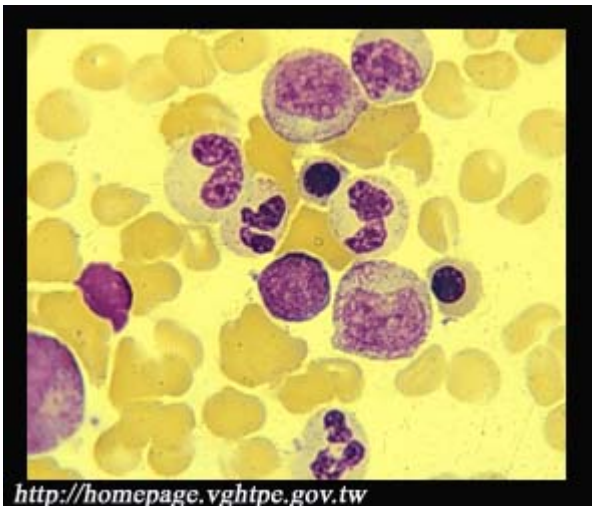
According to data from the American Association of Tissue Banks, bone is the most commonly transplanted tissue in the world. This number of bone tissue donors continues to rise with each year. The primary source of tissue for bone grafts is donated cadaver tissue. For the embalmer, this means an increasing number of cases where bone and connective tissues have been removed from the deceased and more frequent encounters with the embalming problems that are inherent in the recovery of donated tissues. For funeral service in general, it means more frequent contact with tissues banks, and an increasing need to understand the processes and systems that drive tissue banking.

A Model for Cooperation

Important work has been done to facilitate cooperation between funeral directors and tissue banks in the service area of North Central Tissue Services (NCTS), St. Paul, MN, which is among the largest and busiest tissue banks in the American Red Cross system.

NCTS seeks to serve donor families by facilitating tissue donation in an efficient, effective and respectful manner. Likewise, funeral directors seek to serve donor families by facilitating funeral arrangements in an efficient, effective and respectful manner. NCTS and funeral directors have begun to encourage open communication and dialogue in order to encourage a mutual respect

and appreciate for both professions. A funeral director liaison committee meets regularly with representatives of NCTS to discuss issues of importance to funeral directors and, while some discussions within the liaison committee have been lively, they have not been adversarial. The committee represents an effort on the part of funeral directors and tissue bankers to exchange information, come to understand one another and to develop mutual respect for the important work that each performs. At the very heart of this effort is a shared commitment to the donor family. It is this shared commitment that has caused so much of the problems between the two professions. Both sides have shown attitudes of possessiveness and, at times, have become overly protective of donors and donor families.



There are those in tissue banking who would have funeral directors believe that they are too busy to consider taking steps that would facilitate funeralization after the tissue recovery was completed. Such an attitude does not show respect for the donor, the donor family or the funeral director, and should not be accepted by funeral service. Conversely, there are those within funeral service who, while not liking the embalming complications of a tissue donation, blindly accept the disruptive aftermath of recovery procedures as something they cannot change.

There is a perception that the value of tissue donation and transplantation is sufficient to justify any method of tissue recovery. Further, there is a perception that funeral directors should not question the method of recovery for fear of being accused of opposing the value of tissue

donation and transplantation. There are also those in funeral service who openly discourage families from consenting to tissue donation, and when confronted with a donation may covertly disrupt the recovery process by not cooperating.

The Disruptive Nature of Organ Donation

Within tissue banking there are procurement technicians who remove tissue by means of sharp dissection only. Stated simply, sharp dissection means that the technician will cut with impunity any soft tissue that is in the way, including important vessels that embalmers rely on for arterial embalming of the body.

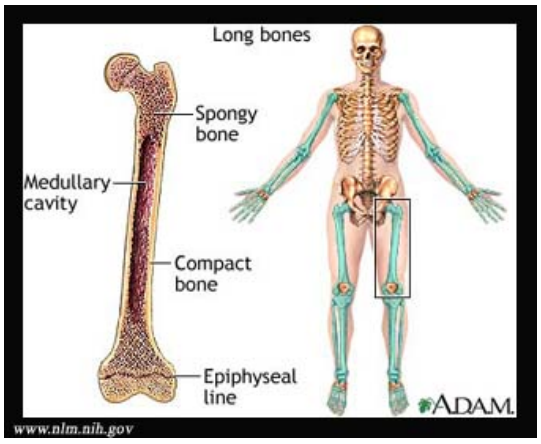
In those cases where tissues have been recovered by sharp dissection, the embalmer may encounter vascular disruptions every few inches in the area where the tissue has been removed. There is no need for the body to be mutilated to that extent, and it goes without saying that sharp dissection recovery procedures do not lend themselves to successful arterial embalming. There are alternatives.

NCTS, working in conjunction with the University of Minnesota Program of Mortuary Science, has developed operating procedures that use a combination of blunt and sharp dissection. The procurement technician uses skills and knowledge of anatomy to remove the donated tissue with as little disruption to the vasculature as possible. Application of this method of tissue recovery takes into consideration that the family may desire a viewing following the donation, and demonstrates respect for the donor, the donor family and the funeral director. That cooperation is

reciprocated by funeral directors who are supportive of the donor family's decision to make the donation and funeral directors who are more supportive of tissue donation in general.

Long Bone Donation

Bones and connective tissues may be removed from a donor in several locations. A brief description of long bone recovery procedures from the hips, thighs and legs will set the stage for a discussion of embalming problems that can be expected in the aftermath of the recovery.



Long bone procurement begins with an incision made along the anterior superior iliac crest. The incision continues along the midline of the thigh, passing around the patella medially and continuing down over the anterior medial aspect of the tibia down to the anterior and midline of the ankle joint. If the heel bone is to be removed, the incision will continue along the medial side of the foot. This type of incision is typically found in long bone donor cases, and does not create disruptions to the vasculature of the hips, thighs and legs that would preclude arterial injection. The procedural steps that follow the initial incision, however, can compound embalming problems in a very dramatic fashion.

A study conducted at the University of Minnesota has shown that for long bone donor cases, the highest level of preservation is achieved by a multipoint arterial injection of the body, and supporting educational materials have been developed to promote that position. However, the

plausibility of using arterial injection may depend on the extent to which tissue procurement technicians have damaged the vasculature of the hips, thighs and legs.

Free Flow Injection Method

Some embalmers have chosen to deal with the multiple disruptions in the vessels of the hips, thighs and legs by injecting the body from a cervical site, leaving the procurement incision sutured and allowing arterial solution to free flow into the tissue beds of the hips, thighs and legs.

Embalmers who commonly use this method feel that the pooling of arterial solution in the tissue beds of the hips, thighs and legs will provide an opportunity for surface embalming to occur. With this approach, the embalmer concentrates on achieving good results for the head, neck, torso, arms and hands, and concedes that the disruptions in the vessels of the hips, thighs and legs will require additional treatments at the conclusion of the arterial injection. And, some embalmers don't apply additional treatments.

Free Flow Complication

The major fallacy of the free flow method lies in the notion that the pooled arterial solution will penetrate into the tissues of the hips, thighs and legs and thus achieve preservation. In one trial study of this technique conducted at the University of Minnesota, embalmers injected high concentration arterial solution into a long bone tissue donor. The solution was injected via the carotid artery, the procurement incision was left sutured and no other steps were taken to treat the hip, thigh and leg on the right side of the subject.

Following the arterial injection, the body was held at room temperature for 15 days. It then underwent an examination to determine the degree of preservation that had been achieved in the right hip, thigh and leg where the free flow had occurred. As the procurement sutures were opened, the examiners found pools of arterial solution and blood in the tissue beds. Palpitation of the tissues provided evidence that not much preservation had taken place, and dissection of the tissues revealed very little penetration of pooled arterial solution into the tissues.

In addition to not providing adequate preservation, the free flow method is neither efficient nor cost-effective. A total of 17 gallons of high concentration arterial solution was injected into the body before the embalmers were satisfied that the head, neck, torso, arms and hands were suitably embalmed for the funeral. Arterial solution leaked profusely from the procurement incision as injection took place, and a good portion of the 17 gallons ran through the body, directly into the flush basin.

Sectional Embalming Method

Other embalmers employ a strategy of sectional embalming where the procurement incisions are opened on both legs and, depending on the amount of damage done to the vasculature of the hips, thighs and legs, the right and left femoral arteries or the right and left external iliac arteries

are located and ligated. The ligation has the effect of isolating the legs from the rest of the body. Once the areas have been isolated, the embalmer will open the artery and begin injection towards the head.

As injection begins, the embalmer can anticipate that leakage will occur on both sides of the hips. Left unattended, this leakage can waste arterial solution and cause a loss of injection pressure and reduce the rate of flow to other parts of the body. The embalmer, however, can control the leakage to a great extent by locating the leaking vessels and clamping them with hemostats. Once the head, neck, torso, arms and hands have been embalmed, the embalmer should at least attempt arterial injection downward toward the feet. It may quickly become apparent that there were too many cuts in the arterial vessels to accomplish arterial injection, and if that is the case, the embalmer should consider using hypodermic and surface embalming techniques.

Undiluted, high index arterial fluid or cavity fluid should be used for hypodermic injection. The hypodermic injection should be administered in such a way as to assure complete and thorough contact with the tissues. Surface embalming can be accomplished by the application of disinfectant, preservative packs or by the application of disinfecting, preserving gels.

Ultimately, embalmers must remember that they have an ethical, professional and legal responsibility to deliver the highest level of expertise in body preparation to the donor family. This is especially true when considering that most client families may not have the expertise to

detect poor embalming results. There is simply no excuse for poor embalming results that come from lack of effort or lack of skill.

Solutions to Embalming the Intravenous Drug Abuser

The intravenous drug abuser presents the embalmer/funeral director with a myriad of problems associated with the recreational injection of drugs. This article will address the various embalming problems associated with drug abusers and how to solve them.

Infective Endocarditis

One of the most common complications in the intravenous drug abuser (IVDA) is the presence of endocarditis. Infective endocarditis is the presence of vegetative organisms on the cardiac valves of infected patients.

The most common causative organism is *S. Aureus* in IVDA patients. This organism along with other microorganisms can infect a patient and at times present a polymicrobial generalized infection with histoplasma, saccharomyces, cryptococcus, candida and other opportunistic organisms. Infection of the left side of the heart is often seen, however, infection of the right side is common in IVDA patients.

The common medical and postmortem complications are, multiple cardiovascular accidents (stroke), herniated brain stem, clubbing of the fingertips, small hemorrhages known as petechiae

and irregular flat erythematous lesions known an Janeway lesions. The endocarditis IVDA patient causes not only vascular problems for the embalmer, but also problems with the integument and fluid balance in the final embalming results.

IVDA and the Integument

Effective results of the embalming process of the IVDA patient must deal with skin complications of the disease. The injection of opiates, heroin, cocaine and other related recreational drugs can cause an inflammatory response of the integument due to their alkaline states. This complication will present the embalmer with necrosis, multiple abscesses, both infective and sterile, infectious cellulitis of the extremities and multiple punctate lesions in the nailbeds of patients known as petechial hemorrhages.

The embalming of the person with these complications requires a minimum fluid dilution of three percent. The fluid should be of a high index, more than 30. The embalmer needs this index to disinfect, dry and reduce tissue swelling during injection of the primary dilution of embalming fluid. The integument ulcers should be treated with cavity with a high phenol content. One must be cognizant that any skin lesions present may be infectious and communicable, often with antibiotic resistant microorganisms that may infect the embalmer.

The most effective treatment for swelling in these cases is careful and methodical massaging of the extremities to reduce fluid deposition in these areas. The limitation of the technique is where the site has been excessively used for injection and had keratinized and thickened to an extent where the damage is unrestorable.

The IVDA Patient and Vascular Considerations

The most crucial and difficult test for the embalmer and the IVDA case is the location, isolation and injection of patent arteries. The IVDA patient when alive is the best phlebotomist and artery locator. Often in emergency situations, the drug user will tell the physician where to start an intravenous or arterial line.

After many years of abuse, the IVDA has very few if any usable veins and arteries to inject. The best method of injecting these cases is to check the entire body for old lesions and scars. These lesions will often occur at the groin, neck, axillaries, dorsum of the hand and anticubital fossa. If the extremity distal to your possible injection site is darkened or necrotic, do not open the artery. The necrosis is due to a lack of circulation secondary to vegetative organisms, atherosclerosis and emboli, which have migrated from the primary lesion. The best injection site is usually the internal carotid artery. With careful blunt dissection and a minimal incision, the carotid can be opened and injected slowly with a low pressure, two to five pounds initially.

The injection should proceed slowly and observe carefully for the presence of migrating emboli. The presence of patent intravenous lines should be left open during the injection. Also, if there are patent arterial lines in the radial or ulnar arteries, these should be used for the injection of the hands and forearm.

Vigorous induction of drainage is crucial to a successful outcome in embalming these cases; the reasons are multiple loose vegetations from the cardiac valves lodged in the extremities, multiple clots formed by disseminated intravascular coagulation (DIC), a common complication in endocarditis, and multiple adhesions caused by excessive scar tissue.

The injection of vascular complicated cases may be aided with the use of catheters. Flexible Teflon and/or polyethylene catheters used in vascular surgery and cardiac catheterizations can be used to selectively inject the head and extremities when regular methods fail. The carotid artery may be atrophic and may contain vegetative material from the infected valve. The catheter is very useful in these cases.

The catheter may be inserted under the guidance of a guide wire and moved to various points in the vascular system and give flow to areas that may otherwise go without good circulation. It is especially useful in the injection of hands and clearing of discoloration.

Other Considerations

One of the most important Occupational Safety and Health Administration (OSHA) rules is the bloodborne pathogen rule. Especially in an IVDA, the remains have an increased risk of transmission of Hepatitis A, B and non-A, non-B genera. The presence of HIV and opportunistic organisms also are prevalent in these populations. The presence of HIV necessitates the utmost precaution in the preparation of these remains.

The IVDA case again requires the use of at least a concentration of two percent and an index of a minimum of 30. In addition, due to stenosis and/or presence of prosthetic valves, the embalmer must use a multi-point injection to ensure thorough distribution of arterial solution. Often body fluid contamination, dilution of edema and renal failure will complicate and retard formaldehyde fixation and preservation. If sepsis is present, the addition of glutaraldehyde is advisable to ensure proper disinfection.