measurement than QA in one plane ($P = 0.00008$). IVUS in two planes correlated more closely with direct caliper measurement than QA in two planes ($P = 0.02$). QA in two planes correlated more closely with direct caliper measurement than QA in one plane ($P = 0.04$). **Conclusions.** IVUS may be used to more accurately measure lumen diameter than QA. Diameter measurements with QA in two perpendicular planes compared to one plane more accurately measures lumen diameter (see figure).

PARALLEL SESSION I

Metabolism, Endocrinology, and Nutrition

27. **Granulation Tissue Apoptosis Induced by a Musculocutaneous Flap.** M. A. Carlson, M.D., and B. T. Baxter, M.D. Department of Surgery, University of Nebraska Medical Center, Omaha, Nebraska.

We hypothesized that wound coverage with an MCF would result in regression and apoptosis of the wound's GT. Wistar rats (350 g; $n = 32$) underwent skin excision (4 cm^2 square from the dorsum), an MCF was placed over the developed GT in 16 rats on postwound day 10, and 16 rats (8 MCF + 8 control) were sacrificed on both day 12 and day 14. Paraffin sections were labeled with TUNEL and propidium iodide, and fluorescent micrographs were analyzed by computer. A wound's apoptotic rate (=No. of TUNEL figures χ No. of PI labeled nuclei $\times$ 100) was the mean of four micrograph rates, and a group rate was the mean of eight wound rates. Cross-section area was calculated from H & E micrographs. Qualitatively, the MCF-covered GT had decreased cellularity (H & E) compared to the control GT at 2 and 4 days of coverage. The group rates within each column of the table were different ($P < 0.05$, ANOVA). The GT apoptotic rate increased at least fivefold in the MCF rats compared to the control rats after 2 and 4 days of MCF coverage. The GT cell population density decreased nearly 50% in MCF group at 2 and 4 days, and the

TABLE—ABSTRACT 27

Group	*n* (rats)	Apoptosis (% ± SD)	Cell pop. dens (nuc/micrograph)	*x*-section area (mm^2)
MCF, 2 days	8	5.52 ± 0.91*	1977 ± 343*	6.35 ± 2.84**
cont, 2 days	8	0.52 ± 0.24	3947 ± 1275	8.05 ± 1.80
MCF, 4 days	8	4.89 ± 0.33*	1938 ± 496*	NA
cont, 4 days	8	0.89 ± 0.49	3009 ± 462	9.27 ± 1.66

* $P < 0.001$ compared to corresponding control, unpaired *t* test.
**$P = 0.055$ compared to control. NA, GT margins indistinct.

GT cross-section area decreased marginally in the MCF group compared to the control group at 2 days. These data, along with the qualitative wound histology, support the hypothesis that wound coverage with an MCF is associated with GT regression and apoptosis. The mechanism of GT regression in this model is as of yet unclear.

28. **Systemic Heat Shock Attenuates the Neuroendocrine Response to Surgical Stress in Rats.** B. B. O'Neill, M.D., S. Sheen-Chen, M.D., W. J. Welch, Ph.D., and H. W. Harris, M.D. UCSF Surgical Research Lab at SFGH, San Francisco, California.

Much of the morbidity associated with elective surgery results from activation of the body's neuroendocrine stress response. The ability to dampen this response could reduce surgical morbidity and thus revolutionize the perioperative management of elective surgical patients. The heat shock response (HSR) is a well-described programmed cellular response to stress that can protect cells from an otherwise lethal injury. If the HSR can protect individual cells, we wondered whether this response could protect an entire organism as well. Specifically, we hypothesized that the induction of a systemic HSR would make rats resistant to surgical stress and thus attenuate their neuroendocrine response to surgery. Rats were either preconditioned by whole body hyperthermia (42°C $\times$ 20 min) or maintained at 37°C (controls). Multiple organs from both groups were then assayed for heat shock protein (hsp) expression via Western blot. After thermal preconditioning, the rats underwent a standardized surgical stress (laparotomy, visceral manipulation, 25% hemorrhage). Subsequently, plasma was assayed for total corticosterone and corticosterone-binding globulin (CBG) as a measure of neuroendocrine axis activation. Preconditioned rats showed activation of the HSR as evidenced by widespread systemic expression of hsp72 versus controls (Fig. 1).

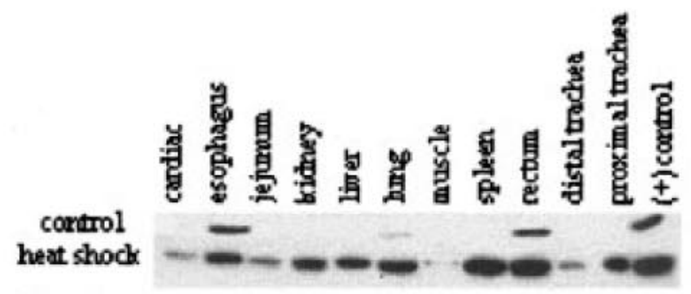

Fig. 1

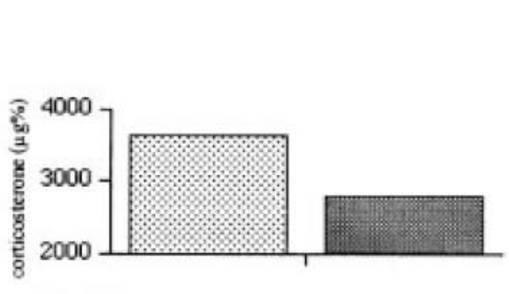

Fig. 2

Corticosterone (rat equivalent to cortisol) was reduced by 25% (Fig. 2), whereas CBG levels were unchanged (data not shown). In conclusion, preconditioned rats showed systemic activation of the HSR with widespread expression of hsp72 and the subsequent attenuation of the animals' neuroendocrine response to surgical stress. These data suggest that activation of the heat shock response may protect an entire animal from the stress of surgical procedures and thus potentially reduce perioperative morbidity.

29. **Imidazole Blockade of Cortisol Synthesis in Burn Patients.** D. W. Hart, M.D., S. E. Wolf, M.D., A. A. Ferrando, Ph.D., C. G. Wigginton, B.S., R. R. Wolfe, Ph.D., and D. N. Herndon, M.D. Department of Surgery, The Shriner's Hospitals for Children and The University of Texas Medical Branch, Galveston, Texas.

Imidazole antifungal agents inhibit synthesis of the sterol ring, thus damaging fungal cell walls. Recently, clinicians have successfully applied this pharmacologic effect to noninfectious human pathology resulting from sterol excess—notably, hypercortisolemic depression and Cushings syndrome. Burn catabolism is also thought to be mediated by excess cortisol production and activity. For this reason, we chose to examine the effect of a common imidazole, itraconazole, on cortisol production and skeletal muscle protein catabolism in burned children. **Methods.** Five subjects received at least a 1-week course of itraconazole. None were clinically suffering from invasive fungal wound infections, had documented fungemia or bacteremia, or received any other anabolic agents prior to or during study. All subjects were studied in two periods: Baseline (untreated) and Treatment in the itraconazole subjects, and Baseline and Time Control in 12 subjects serving as a control group. Main outcome measures for comparison were resting energy expenditure, urine cortisol levels, and cross-leg protein net protein balance derived from stable isotope tracer methodology. **Results.** The 5 itraconazole and 12 control subjects were similar in age, sex, burn size, and time after burn at the metabolic studies. Subjects receiving imidazoles experienced a decrease in urinary cortisol excretion and improved skeletal