The Use of “Brass Bolus” for Chestwall Irradiation

“Brass Bolus” is available from Whiting and Davis Company:

http://www.whitinganddavis.com/Products_brass.htm

We now use a single mesh sheet measuring 18"x18" of the SM70BR-Gold fabric. It's approximately $80 per sheet.

I first learned of brass bolus back in 1980 by reading "Dosimetry for Tangential Chest Wall Irradiation" by Fessenden, Palos, and Karzmark in Radiology, Vol 128, No 2, pgs 485-489, August 1978.

At that time, many centers made a 2 cm bolus using a pink powder mixed with water that made a goopy gel. The gel was wrapped in plastic to keep its shape. This bolus would be used every other day to increase the dose to the chestwall.

For those of you old enough to remember, the gel bolus had its problems. Worst of all, it would lose its consistency with time. So you had to make a new one on a regular basis.

Then the physicists at Stanford reported that four sheets of brass mesh would be a good alternative for chestwall bolus. That was true because it would not degrade with repeated use. It would also conform better to the contour of the chestwall.

So back in 1980, we followed their lead and used four layers of brass mesh every other day. It was better than gel bolus but there were other issues. The therapists had to remember each day whether or not to use the bolus. And we struggled with the idea of running a bolus plan and open plan with different MU on alternate days. We decided not to do that because the net effect on total dose to the deep tissue was only 2-3% which was not deemed worth the effort.

Then in 2001, I wondered if there was a magic number of brass mesh sheets which would give the same net dose in the build-up region as four sheets every other day. Much to my surprise, it only takes one sheet to do it.

Using a Markus chamber and polystyrene plates with 6X, I measured:

Depth	No Bolus	4 Sheets	Net	1 Sheet
0.0	23%	80%	51%	54%
0.14	52%	86%	69%	69%
0.28	68%	91%	79%	79%

I estimated that 1 sheet of brass mesh is equivalent to 2 mm of tissue. This was based on the shift of the buildup curve as well as the attenuation measured at 5 cm depth (TF = 0.993) (Other physicists have since told me they concur.)

For the first several months, we did TLD on patients and confirmed the net skin dose using 4 sheets QOD was the same as 1 sheet QD. Plus the the clinical skin reactions looked the same as in the past so that was convincing as well.

Regarding beam energy, the majority of cases were 6X, while some were a mix of 6X and 16X. We used the same 1 sheet of brass bolus in each case. Even though 16X has a lower entrance dose on a flat surface, I find the skin dose on a chestwall is not much different that 6X. Perhaps that is because of the increased exit dose with 16X as well as extended range of the Compton electrons generated at depth by 16X.

Regarding treatment plans, our Pinnacle does not let us apply a 2 mm bolus. But even if it did, the change in MU would be insignificant. So we run the plan with no bolus and use those MU for treatments with bolus knowing the skin dose as well as dose at depth is just what the doctor ordered.

Bottom line is that we are pleased with using one sheet of brass mesh every day as bolus for chestwalls. Please let me know if you have any comments one way or the other. Thanks.

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