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SERVICE DE RADIOLOGIE
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MONTRÉAL 18, P.Q.
VI. 2-5201, Loc. 207

Au-198

The Therapeutic Use of Radioactive Gold Seeds in Neoplasms

Paul Lachance, M.D., A.F. Vallée, M.D.

In 1952, Hodt, Sinclair and Smithers from the Royal Marsden Hospital In London, had described a radioactive gold grain introducer used for permanent implantation in tumors. Since then, hindreds of cases have been reported with satisfactory results.

The apparatus consists of the introducer or the "gun" which is loaded with a magazine or cartridge containing fifteen radioactive gold grains. These grains are cylinders made of gold encased in platinum and their measurements are so: lenght: 2.1 mm, diameter: 0.4 mm, weight: 25 mgm, platinum casing: 0.2 mm. Our supplier is the Atomic Energy of Canada Ltd.

The aluminum magazines with their fifteen grains are placed in the nuclear reactor for a 36-hour neutron irradiation and the isotope Gold Au 198 is produced. The half-live of Au 198 is 2.72 days. The Beta activity around a seed is of no importance due to the filtration with 0.2 mm Platinum.

Society of Nuclear Medicine
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DISCLAIMER

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The radioactive gold seeds are ready for use 7 to 10 days later on when Gamma activity is around 3 to 4.5 mc per seed. It should be noted here that when the grains are not been used they can be returned to the supplier and be reactivated in the pile.

At the moment of an implantation, the aluminum cartridge containing fifteen radioactive grains, is loaded in the gun barrel and a shaft pushed forward primes the gun. The fifteen grains rest in the needle of the gun and one by one they are ejected when the trigger is pulled. The needle, graduated in centimeters, is inserted into the tumor and the Seeds are distributed one centimeter apart. The permanent implant gives to the tumor an approximate dose of 6-7,000 r in 4 to 5 days.

Radiation exposure for the operator at trigger zone is of 0.7 r per hour when the activity of each fifteen grains is around 4.8 mc.

A large variety of tumors of different volume, localisation and histological type were treated by this method, that means 73 patients totaling 168 lesions. This type of interstitial radiotherapy was sometimes combined with surgery, external radiotherapy and chemiotherapy according to each case.

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Therefore results tabulated in this series are confined to local response.

Of 123 lesions of 3 cms diameter or less, 88 were considered cured after 6 months. Of 33 lesions of more than 3 cms, 13 were cured, 15 were persistent and 30 could not be followed due to difficulty in obtaining control cystoscopies.

It should be noted that 21 patients died within 12 months, mostly palliative cases with existing distant metastases. The actual 5 year survival is of 11 patients.

The advantages of this method are numerous.
a) Manipulation is simple and easy. b) The tumor dose delivered is of 6,000 to 7,000 r. c) The cost of the gun is of $ 300.00 and each grain cost $ 1.00 A 50% allowance is made for each full unused magazine returned to the supplier for reactivation. d) Local response is very satisfactory. e) Complications as tissue necrosis, perforation of a large vessel or a duct, fistulae are minimal and in this series, absent.

THE THERAPEUTIC USE OF RADIOACTIVE GOLD SEEDS IN NEOPLASMS

		No CASES	No LESIONS	DIMENSION		RESULTS AFTER 6 MONTHS					
						- 3 cms			+ 3 cms		
				- 3 cms	+ 3 cms	CURED	PERSIS-TENT LESIONS	No FOLLOW-UP	CURED	PERSIS-TENT LESIONS	No FOLLOW-UP
BLADDER		37	50	27	23	13		14	11	2	10
BREAST		13	69	68	1	60	4	4			1
GYNECOLOGICAL	CERVIX UTERI	5	11	11		8	3				
	VAGINA	3	4	2	2	2			2		
	VULVA	1	1	1			1				
	URETHRA	2	2	1	1			1			1
	BLADDER SECUNDARY TO UTERUS	2	2	2				2			
HEAD AND NECK	TONGUE	3	7	4	3	4					
	FLOOR OF MOUTH	4	7	5	2	1	3	1		1	1
	SOFT PALATE	2	2	2			1	1			
	LARYNX	1	1		1						1
TOTAL		73	156	123	33	88	12	23	13	3	17

RADIOACTIVE GOLD SEEDS IN NEOPLASMS

ADVANTAGES

Easy manipulation,

High tumor dose,

Low cost,

Good results,

Complications : minimal or absent.

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