Results

4.1. Milk analysis

The percent of Fat, Lactose, solid not fat, protein and salt found in camel milk obtained from Ras Sedr and Marsa Matrouh is shown in **Table (2).** The constituents of camel milk obtained from both sources were relatively close to each other. However, the fat was a bit lower in Marsa Matrouh camel milk.

Table (2): showing different constituents of camel milk obtained from Ras Sedr and Marsa Matrouh using Milk analyzer

Camel milk	Ras Sedr	Marsa Matrouh
PH	2.4	2.39
Freezing point	0.622	0.566
Density	32.78	31.08
Fat %	5.33	3.74
Lactose %	5.05	4.73
Solid not fat %	9.58	8.94
Protein %	3.57	3.33
Salt %	0.91	0.83

4.2. phenolic content of curcuma longa ethanolic extract

The content of total phenolic compounds in curcuma longa ethanolic extract, expressed as gallic acid equivalents per gram of dry extract, was approximately 274.5 mg of GaE/g. A standard curve made from different concentrations of gallic acid was used to plot the optical density of sample against the concentration of gallic acid (**Chart 1).** The increase in the optical

density of the sample results in an increase in gallic acid equivalent and in turn indicates a high total phenolic content.

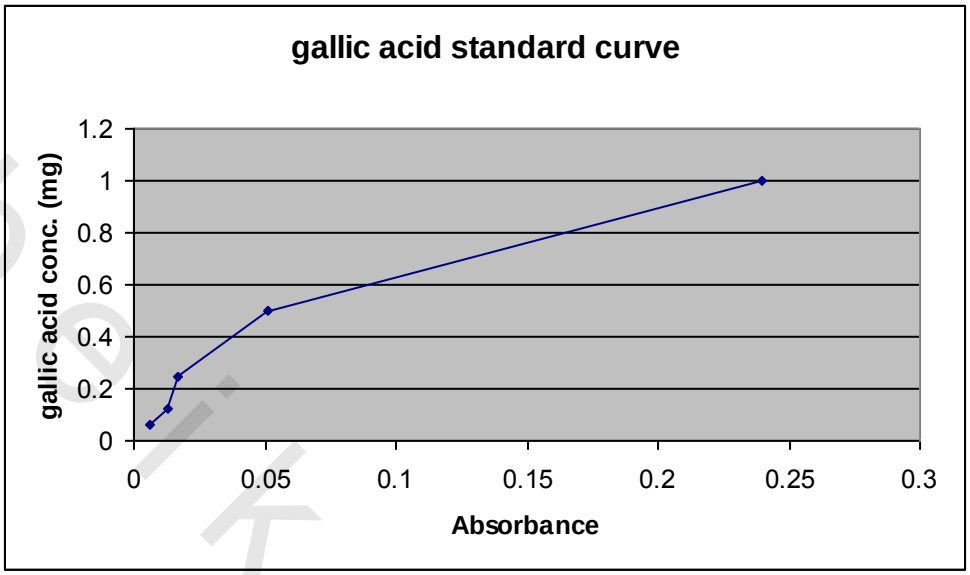

Chart (1): showing the absorbance of different concentrations of gallic acid forming a standard curve.

4.3. Body weights

There was a significant increase in body weight of group 2 at 3 and 9 weeks post injection of DENA when compared to group 1 (control group). However, there was a significant decrease in body weight of group 2 when compared to control group (group 1) starting from 14th week to 25th week post injection of DENA (**table 3).**

There was a significant decrease in body weight in group H and a significant increase in group G at week 29th post injection of DENA. Group J showed a significant decrease in body weight and group C showed a significant increase in body weight at week 30. Group C expressed a significant increase in body weight at 31st week as well. At 32nd week, group K and L expressed a significant decrease in body weight whereas group C

showed a significant increase in body weight. No significant difference was detected in body weight at 33 weeks post injection. Moreover a significant increase in group C at 34th week was shown. There was a significant decrease in body weight of group H at 34 weeks post injection of DENA (**Table 4).**

At 35th week post injection, there was a significant decrease in body weight in group H, I and L whereas group C showed a significant increase in body weight. At 36th week post injection, group I showed a significant decrease in body weight and group B showed a significant increase in body weight. At 37th and 38th week post injection, there was no significance detected between groups (**Table 5).**

Table (3): showing statistical analysis of rats body weight (grams) from 1st week to 28th week post injection of DENA

week	Group 1	Group 2
1	109.52±2.28	115.36±3.01
2	124.78±2.43	127.59±3.05
3	125.95±2.30	135.14±2.92*
5	154.32±2.75	156.14±3.16
6	161.94±2.76	166.29±3.04
7	171.6±3.02	176.1±3.19
8	177.8±3.08	179.35±3.24
9	175.84±3.03	185.83±3.18*
10	212.16±3.51	204.93±3.41
11	219.6±3.55	211.5±3.74
12	236.66±4.06	226.85±4.00
14	254.40±4.28	241.89±4.52 *
15	263.3±4.36	251.1±4.32
16	280.46±5.36	257.87±4.59 *
17	298.96±7.00	267.75±5.10 *
18	299.68±5.70	271.77±4.98 *
19	310.08±5.87	279.75±5.22 *
20	315.70±6.51	288.62±5.51 *
21	317.63±6.69	294.15±5.57 *
22	297.34±6.47	280.66±5.92
23	281.63±5.71	260.06±5.14 *
24	258.32±5.37	245.91±5.14
25	289.45±5.89	262.51±5.15 *
26	295.56±6.25	282.48±6.30
27	283.89±5.48	271.9±6.43
28	288.34±6.10	282.40±6.61

All data presented as mean value (n= 48) ± Standard error

* considered significant at $P < 0.05$

Group 1 is a control group. Group 2 is injected with DENA

Table (4): showing statistical analysis of rats body weight (grams) for 6 weeks after treatment commencement

group	29th week	30th week	31st week	32nd week	33rd week	34th week
A	269.14±11.64	279.57±12.53	300.57±10.25	317.57±9.89	341.42±5.93*	352.42±6.14
B	278±13.49	283.28±14.31	295.28±14.62	319±15.09	337.57±17.12	344±18.18
C	292.85±8.84	324±14.83*	334.5±15.61*	337.57±13.91*	339.28±38.33	395±20.40*
D	291.28±16.21	296.42±14.67	309.28±13.91	326.71±15.02	348±16.13	362.28±18.35
E	273.42±16.46	280.42±17.76	300.14±18.53	285.28±19.68	314.28±23.36	323.28±22.91
F	278.42±19.93	271.57±18.25	282.14±19.34	299.28±21.2	331.14±24.32	342.42
G	305.85±14.53*	307.85±13.9	299.14±11.96	323.14±13.30	332.57±10.67	340.14±10.05
H	253.42±16.44*	253.28±15.63	263.85±17.07	276.14±17.06	289.42±17.40	302±17.62*
I	275±8.71	262.14±7.95	274.42±8.53	286.28±9.91	307.28±11.59	306±8.41
J	268±19.01	251.28±28.34*	276.71±18.19	295.57±19.20	285.28±21.63	307.42±17.37
K	270±10.32	264.71±12.29	274.57±14.51	266±11.86*	286.28±12.82	305.28±12.17
L	268.85±18.89	272.57±19.05	276.28±18.54	256.14±14.80*	299.85±16.99	313.71±19.41

All data presented as mean value (n=7) ± SE. *considered significant at $P < 0.05$
Group A is a control negative group. Group B was treated with camel milk. Group C was treated with camel milk and turmeric extract. Group D treated with turmeric extract. Group E treated with cisplatin. Group F treated with camel milk and cisplatin. Group G injected with DENA. Group H injected with DENA and treated with camel milk. Group I injected with DENA and treated with camel milk and turmeric extract. Group J injected with DENA and treated with turmeric extract. Group K injected with DENA and treated with cisplatin. Group L injected with DENA and treated with cisplatin and camel milk.

Table (5): showing statistical analysis of rats body weight (grams) in the last 4 weeks of experiment

group	*35th week*	*36th week*	*37th week*	*38th week*
A	353.42±6.24	366.5±7.77	376.75±7.88	379.50±5.20
B	348.57±18.75	380.75±33.77*	393.75±38.10	401.5±38.19
C	375±14.861*	373.33±22.24	382.3±23.70	392.66±24.03
D	370.71±18.72	360±26.11	367.75±26.44	372.5±24.84
E	340.71±20.32	349.50±28.83	362.25±27.27	368.5±29.55
F	340±22.99	376±40.253	385±41.47	386.67±7.08
G	340.42±7.77	356.6±22.51	364±25.54	362.66±22.98
H	296±20.92*	310±25.18	317.75±27.05	321.50±26.02
I	312.42±8.75*	298±17.61*	319.66±32.33	355.33±0.33
J	323.85±13.71	311±19.69	313.33±19.78	325.33±16.75
K	321±15.87	346.75±2.35	360.75±3.09	362±5.33
L	316.28±21.53*	338.5±16.03	343.75±15.11	347.75±14.91

All data presented as mean value (n=3- 4) ± Standard error. *considered significant at $P < 0.05$
Group A is a control negative group. Group B was treated with camel milk. Group C was treated with camel milk and turmeric extract. Group D treated with turmeric extract. Group E treated with cisplatin. Group F treated with camel milk and cisplatin. Group G injected with DENA. Group H injected with DENA and treated with camel milk. Group I injected with DENA and treated with camel milk and turmeric extract. Group J injected with DENA and treated with turmeric extract. Group K injected with DENA and treated with cisplatin. Group L injected with DENA and treated with cisplatin and camel milk

4.4. Relative kidney and liver weight

Group 2 showed a significant increase in relative liver weight at 19 and 28 weeks post injection of DENA (**Table 6).** Similarly, group K showed a significant increase in relative liver weight at 34th week. At 38th week post injection, group G expressed a significant increase in relative liver weight whereas group L expressed a significant decrease compared to control negative group (**Table 7).**

Relative kidneys weight showed no significant difference between groups at 19, 28 and 34 weeks post injection of DENA. However at 38th weeks, there was significant increase in relative kidneys weight of group H whereas there was a significant decrease in group I and L (**Table 7).**

Table (6): showing relative liver and kidneys weights at 19 and 28 weeks post injection of DENA

	Relative Liver weights (g)		**Relative Kidneys weights (g)**	
	19 weeks	**28 weeks**	**19 weeks**	**28 weeks**
Group 1	3.21±0.28	3.54±0.29	0.63±3.93	0.88±8.83
Group 2	4.67± 9.6*	5.06±0.13*	0.76±5.36	0.85±3.62

All data presented as mean value (n=3) ± Standard error

* considered significant at $P < 0.05$

Group 1 is a control group. Group 2 is injected with DENA

Table (7): showing relative liver and kidneys weights (grams) at 34th and 38th week post injection of DENA.

	Relative liver weights (g)		Relative kidneys weights (g)	
	34 weeks	**38 weeks**	**34 weeks**	**38 weeks**
GP A	3.25±0.18	3.7±0.24	0.86±4.13	0.87±2.88
GP B	3.17±0.30	3.26±0.14	0.85±5.59	0.70±6.04
GP C	3.23±0.10	3.62±0.16	0.88±2.09	0.72±4.74
GP D	3.85±0.10	3.24±0.12	0.82±9.71	0.76±2.85
GP E	3.32±4.09	3.21±8.44	0.80±4.91	0.71±2.57
GP F	3.55±0.10	3.53±0.12	0.87±4.84	0.70±7.83
GP G	3.52±0.35	4.23±1.43*	0.78±2.42	0.79±7.26
GP H	3.66±5.6	4.01±0.19	0.80±5.93	0.90±4.76*
GP I	3.73±0.29	3.41±7.32	0.80±2.74	0.49±2.85*
GP J	3.97±3.36	4.05±0.10	0.82±1.38	0.75±6.25
GP K	4.13±0.21*	3.35±0.10	0.82±5.22	0.71±6.13
GP L	3.67±0.34	3.11±9.39*	0.80±9.07	0.58±3.72*

All data presented as mean value (n=3-4) ± SE
* considered significant at $P < 0.05$

4.5. Biochemical analysis and hematology

The biochemical analysis of rat sera at 19 and 28th weeks is tabulated in (**Table 8)**. It showed a significant decrease in serum albumin in group 2 compared to control group (group 1) at 19 weeks post injection whereas no significant difference was seen in studied blood parameters at 28th week.

The studied blood variables at 34th week post injection of DENA expressed a significant difference in total protein, albumin, AST, urea, creatinine and alpha fetoprotein. Concerning the total protein, the highest value was entitled to group C treated with camel milk and turmeric extract whereas the lowest value was recorded in group E treated with cisplatin. The values of other groups lied in between these two. The albumin on the other hand significantly decreased in group K injected with DENA and treated

with cisplatin as well as in group D treated with turmeric extract compared to the control group. Other albumin values were quite close to each other.

Regarding the liver enzymes, the ALT activity showed almost no significant difference between different groups whereas AST activity showed a significant increase in group H injected with DENA and treated with camel milk as well as in group L injected with DENA and treated with camel milk and cisplatin compared to the control negative group. On the other hand the kidney function tests performed revealed a significant increase in urea concentration in group E treated with cisplatin and group K injected with DENA and treated with cisplatin compared to the control positive group. Moreover, creatinine concentration showed a significant increase in group K injected with DENA and treated with cisplatin and group L injected with DENA and treated with camel milk and cisplatin compared to most of the other groups but remarkably they were not significant with the control negative group (**Table 9)**. Looking to table (**9**), the results of the alpha fetoprotein, the liver tumor marker, were not consistent as there was a significant elevation detected in favor of the control negative and control positive groups.

The biochemical analysis of different studied serum variables at the 38th week of DENA injection is tabulated in **table (10)**. A significant difference was detected in total protein, ALT, urea and alpha fetoprotein. Group G injected with DENA and group K injected with DENA and treated with cisplatin expressed a significant increase in total protein compared to the control negative group (A). Concerning the ALT activity, a significant increase was recorded in most of the groups compared to the control

negative group. The highest value was seen in group H injected with DENA and treated with camel milk. The AST activity was relatively elevated in group J injected with DENA and treated with camel milk and turmeric extract. However this elevation was not significant with the control negative group. Looking to the concentration of urea in different groups, a highly significant elevation was detected in group L injected with DENA and treated with camel milk and cisplatin as well as in group E treated with cisplatin compared to the control group. Nevertheless, a significant increase was also observed in group G, K and L **(Table 10)**. Additionally, the concentration of alpha fetoprotein was elevated in groups G, J and L compared to the control negative group.

Table (8): showing results of biochemical analysis performed on rat serum at 19 and 28 weeks post injection of DENA

time	Group	Total protein g/dl	Albumin g/dl	ALT (U/L)	AST (U/L)	Urea (mg/dl)	Creatinine (mg/dl)	α- fetoprotein (µg/l)
19 w	**1**	11.63± 0.6	***4.43***±8.8	***25***±0.0	***36***±2.8	***36.86***±1.65	***0.78***±3.2	***0.75***±5
	2	9.06±1.4	***4.10***±5.7*	***23.6***±2.6	***36***±2.8	***25.93***±2.05	***0.83***±6.6	***1.28***±0.1
28 w	**1**	8.85±1.55	***4.36***±3.3	***34***±2.8	***50.3***±1.6	***52.73***±0.72	***0.69***±3.2	***0.8***±5.7
	2	***10.96***±1.4	***4.16***±0.13	***32.3***±5.4	***39.6***±6.3	***58.43***±9.30	***0.70***±4.4	***1.0***±0.3

All data presented as mean value (n=3) ± Standard error

*considered significant at $P < 0.05$

Group 1 is a control group. Group 2 is injected with DENA

Table (9): showing results of biochemical analysis performed on rat serum subjected to different treatments at 34th weeks post injection of DENA

GP	Total protein g/dl	Albumin g/dl	ALT (U/L)	AST (U/L)	Urea (mg/dl)	Creatinine (mg/dl)	α- fetoprotein (µg/l)
A	*9.33±2.25^{a,b,c}*	*4.33±0.24^{b,c}*	*23.66±1.33*	*23.33±4.33^{a}*	*37.79±4.96^{a,b,c}*	*0.90±0.09^{d,e}*	*2.25±9.27^{d}*
B	*11.56±1.96^{b,c}*	*4.4±0.10^{b,c}*	*23.66±1.33*	*37.66±1.66^{a,b}*	*27.46±2.17^{a,b}*	*0.65±0.03^{a,b}*	*1.42±0.23^{a,b,c,d}*
C	*13.69±0.28^{c}*	*4.35±8.66^{b,c}*	*25±0*	*38.5±1.44^{a,b}*	*26.9±1.38^{a,b}*	*0.66±0.04^{a,b}*	*1.78±0.94^{b,c,d}*
D	*9.66±1.94^{a,b,c}*	*3.43±0.24^{a}*	*23.66±3.52*	*30.33±5.66^{a,b}*	*33.57±4.79^{a,b,c}*	*0.59±0.06^{a}*	*0.69±0.10^{a,b}*
E	*6.43±1.35^{a}*	*4.06±3.33^{b}*	*19.66±2.6*	*23.66±6.22^{a}*	*40.13±3.2^{b,c,d}*	*0.8±0.05^{b,c,d}*	*0.93±4.29^{a,b,c,d}*
F	*12.48±1.24 ^{b,c}*	*4.30±1^{b,c}*	*29±0*	*38±7^{a,b}*	*37.39±6.3^{a,b,c}*	*0.69±0.08^{a,b,c}*	*1.23±0.52^{a,b,c,d}*
G	*10.53±1.55 ^{a,b,c}*	*4.33±3.33^{b,c}*	*22.33±1.33*	*30.33±1.27^{a,b}*	*24.5±1.27^{a}*	*0.77±0.01^{b,c,d}*	*2.16±0.61^{c,d}*
H	*7.8±0.40^{a,b}*	*4.36±0.18^{b,c}*	*21±0*	*48±9.6^{b,c}*	*37.03±3^{a,b,c}*	*0.81±0.04 ^{b,c,d}*	*0.54±0.34^{a,b}*
I	*8.10±1.38^{a,b}*	*4.03±0.18^{b}*	*26.33±1.33*	*39.66±4.66^{a,b}*	*30.88±3.75^{a,b}*	*0.83±0.04^{c,d,e}*	*0.9±0.1^{a,b,c}*
J	*12.70±1.15^{b,c}*	*4.7±5.77^{c}*	*23.66±1.33*	*31.33±2.6^{a,b}*	*36.93±5.46^{a,b,c}*	*0.73±0.12 ^{a,b,c}*	*1.4±0.18^{a,b,c,d}*
K	*12.26±0.17^{b,c}*	*3.13±0.23^{a}*	*26.33±1.33*	*31.33±2.6^{a,b}*	*47.13±3.94 ^{c}*	*0.92±0.02^{d,e}*	*0.43±0.24^{a}*
L	*9.93±0.88^{a,b,c}*	*4.3±0.15^{b,c}*	*22.33±3.5*	*65±13.85^{c}*	*35.03±2.5^{a,b,c}*	*0.98±0.07^{e}*	*1.06±0.19^{a,b,c,d}*

All data presented as mean value (n=3) ± Standard error. Values bearing different superscripts (a,b,c,d,e) are significant at P < 0.05..Group A is a control negative group. Group B was treated with camel milk. Group C was treated with camel milk and turmeric extract. Group D treated with turmeric extract. Group E treated with cisplatin. Group F treated with camel milk and cisplatin. Group G injected with DENA. Group H injected with DENA and treated with camel milk. Group I injected with DENA and treated with camel milk and turmeric extract. Group J injected with DENA and treated with turmeric extract. Group K injected with DENA and treated with cisplatin. Group L injected with DENA and treated with cisplatin and camel milk

Table (10): showing results of biochemical analysis performed on rat sera subjected to different treatments at 38th weeks post injection of DENA

GP	*Total protein g/dl*	*Albumin g/dl*	*ALT (U/L)*	*AST (U/L)*	*Urea (mg/dl)*	*Creatinine (mg/dl)*	*α- fetoprotein (µg/l)*
A	$9.29\pm1.08^{a,b}$	3.1 ± 0.24	14.5 ± 2.8^{a}	$39\pm7.9^{b,c}$	32.4 ± 1.12^{a}	0.99 ± 0.14	0.58 ± 0.23^{a}
B	$10.11\pm0.67^{a,b,c}$	3.4 ± 0.25	$26.25\pm5.2^{b,c}$	$19.5\pm5.8^{a,b}$	32.5 ± 2.4^{a}	1.08 ± 9.2	$1.2\pm5.8^{a,b,c}$
C	$11.55\pm0.18^{a,b,c,d}$	3.5 ± 0.17	32.33 ± 3.33^{c}	$20.6\pm3.28^{a,b}$	$36.63\pm2.48^{a,b}$	0.87 ± 4.6	$1.1\pm0.22^{a,b,c}$
D	7.74 ± 2.18^{a}	3.52 ± 0.25	$28.25\pm2.13^{b,c}$	$24.0\pm2.5^{a,b,c}$	$46.9\pm3.8^{a,b,c}$	0.81 ± 4.9	$0.68\pm0.16^{a,b}$
E	$12.8\pm1.37^{a,b,c,d}$	2.7 ± 0.35	$27.25\pm2.25^{b,c}$	$17.75\pm2.1^{a,b}$	$49.97\pm9.2^{b,c}$	0.92 ± 8.8	$1.2\pm9.3^{a,b,c}$
F	$9\pm2.09^{a,b}$	3.2 ± 1.0	$30.66\pm1.66^{b,c}$	16 ± 0^{a}	$35.43\pm2.3^{a,b}$	0.92 ± 5.29	$1.2\pm0.13^{a,b,c}$
G	15.83 ± 5^{d}	2.5 ± 5.7	$21\pm2.3^{a,b}$	$24\pm6.65^{a,b,c}$	$47\pm7.1^{a,b,c}$	1.05 ± 0.2	$1.45\pm0.19^{b,c}$
H	$10.47\pm1.79^{a,b,c}$	3.2 ± 0.33	32.7 ± 1.25^{c}	$34.5\pm8.83^{a,b,c}$	$41.1\pm2^{a,b,c}$	0.9 ± 4.65	$1.01\pm0.24^{a,b}$
J	$8.66\pm1.24^{a,b}$	2.6 ± 0.63	$28\pm3^{b,c}$	43.33 ± 16.33^{c}	$33.8\pm6.5^{a,b}$	0.69 ± 5.9	$1.46\pm0.24^{b,c}$
K	$14.68\pm3.08^{c,d}$	2.9 ± 0.24	$24.25\pm3.6^{b,c}$	$18\pm3.13^{a,b}$	$46.45\pm5.6^{a,b,c}$	0.94 ± 3.4	$1.3\pm0.13^{a,b,c}$
L	$13.5\pm1.79^{b,c,d}$	3.4 ± 0.21	$25\pm1.63^{b,c}$	$26.5\pm4.9^{a,b,c}$	54 ± 4.9^{c}	0.96 ± 4.12	1.9 ± 0.53^{c}

All data presented as mean value (n=3-4) ± Standard error. Values bearing different superscripts (a,b,c,d) are considered significant at $P < 0.05$.Group A is a control negative group. Group B was treated with camel milk. Group C was treated with camel milk and turmeric extract. Group D treated with turmeric extract. Group E treated with cisplatin. Group F treated with camel milk and cisplatin. Group G injected with DENA. Group H injected with DENA and treated with camel milk. Group I injected with DENA and treated with camel milk and turmeric extract. Group J injected with DENA and treated with turmeric extract. Group K injected with DENA and treated with cisplatin. Group L injected with DENA and treated with cisplatin and camel milk

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Hematology

At 34th week, the hematology revealed a significant decrease in PCV in group L injected with DENA and treated with cisplatin and camel milk and a significant increase in total leukocytic count in group K injected with DENA and treated with cisplatin. Group L also showed a significant decrease in percent of neutrophils and a significant increase in percent of lymphocytes (**Table 11).** At 38th week, a significant decrease in haemoglobin concentration in group G was detected. Moreover, group F exhibited a significant increase in lymphocyte percent and a significant decrease in neutrophil percent (**Table 12).**

Table (11): showing results of hematology performed at the 34th week post injection of DENA

GP	*PCV%*	*Hb(g/dl)*	*RBC (cell/µl)*	*TLC (cell/µl)*	*Neutrophil%*	*Lymphocyte%*	*Monocyte%*	*Eosinophil %*
A	*38.6±1.2*	*13.06±0.32*	*5.85±0.14*	*8.13±0.35*	*38.0±2.3*	*62±2.3*	*0*	*0*
B	*43.6±2.6*	*13.5±0.67*	*7.03±1.08*	*9.73±1.63*	*31.66±1.66*	*67.66±1.45*	*0.66±0.66*	*0*
D	*32.5±0.7*	*15.6±1.83*	*7.9±1.25*	*8.3±1.3*	*32.00±4.00*	*67±3*	*0*	*1±1*
E	*32±1.7*	*14.63±1.13*	*8.08±0.64*	*11.6±1.7*	*39.33±5.20*	*59.33±5.2*	*0.66±0.66*	*0.66±0.6*
F	*29.6±1.2*	*12.7±0.28*	*6.7±0.32*	*5.56±0.5*	*25.33±1.76*	*74.66±1.7*	*0*	*0*
G	*42.3±2.0*	*11.86±1*	*6.48±1*	*7.46±0.58*	*32.66±1.7*	*65.33±2.66*	*0*	*2*
H	*40.3±1.8*	*13.7±0.8*	*7.68±0.52*	*9.4±1.4*	*33.00±3.6*	*67±3.6*	*0*	*0*
I	*35.5±2.5*	*13.25±.15*	*7.67±0.37*	*7.2±0.8*	*34.50±0.5*	*65.5±0.5*	*0*	*0*
J	*35.3±1.2*	*12.06±0.63*	*6.38±0.81*	*16.32±1.99**	*37.33±2.4*	*62.66±2.4*	*0*	*0*
K	*29.3±1.2**	*12.2±1.4*	*7.48±0.84*	*11.9±2.8*	*24.00±2.3**	*76±2.3**	*0*	*0*

All data presented as mean value (n=3) ± SE.*considered significant at P < 0.05.
PCV: packed cell volume; Hb: haemoglobin; RBC: red blood corpuscle count; TLC: total leukocytic count
Group A is a control negative group. Group B was treated with camel milk. Group C was treated with camel milk and turmeric extract. Group D treated with turmeric extract. Group E treated with cisplatin. Group F treated with camel milk and cisplatin. Group G injected with DENA. Group H injected with DENA and treated with camel milk. Group I injected with DENA and treated with camel milk and turmeric extract. Group J injected with DENA and treated with turmeric extract. Group K injected with DENA and treated with cisplatin. Group L injected with DENA and treated with cisplatin and camel milk

Table (12): showing results of hematology performed at the 38th week post injection of DENA

GP	PCV %	Hb(g/dl)	RBC (cell/µl)	TLC (cell/µl)	Neutrophil %	lymphocyte %	Monocyte %	*Eosinophil %*
A	34.25±2.05	14.43±0.8	7.5±0.56	11.75±1.5	33.5 ± 4.9	63± 5.1	0.5 ±0.5	***3 ± 1***
B	39.33±2.6	15.1±0.38	9.76±1.2	15.2±3.6	26.66±2.4	70±4.16	1.33±1.3	***2 ±1.15***
C	37.33± 1.33	16.24±0.1	5.83±1.24	11.8±3	26 ±2	72 ± 0	1 ± 1	***1 ±1***
D	31.75±1.25	16.06±0.1	6.97±0.36	9.28±1.3	30.00±00	70 ± 0	0	***0***
E	33±0.4	15.95±0.3	6.46±0.44	13.27±0.6	32.5±2.8	66.5±2.21	0.5±0.5	***0.5±0.5***
F	34.0±1.52	15.36±0.3	7.16±0.06	12.6±2.4	16.6±1.76 *	82.6±1.76*	0	***0.66 ±0.66***
G	36.5±4.5	13.58±0.6*	5.97±0.87	15.6±1.6	28±8	69.0±7	1 ± 1	***2± 2***
H	35.75±1.75	16.65±1.0	7.96±0.26	12.66±2.1	18.00±4.1	76±2.9	2 ± 1.15	***3.33 ±0.66***
J	32.5±2.05	14.92±1.0	7.67±0.92	12.73±3.0	_____	_____	0	_____
K	30.5±0.64	14.48±0.3	6.8±0.78	10.18±1.7	31.5 ±2.7	65± 1.7	1 ±0.57	***2.5 ± 0.95***
L	37.75±3.8	15.01±0.7	5.9±1.25	10.2±0.92	24.5±2.7	71.5±1.25	2.3	***1 ± 0.57***

All data presented as mean value (n= 3- 4) ± Standard error.*considered significant at $P < 0.05$

PCV: packed cell volume; Hb: haemoglobin; RBC: red blood corpuscle count; TLC: total leukocytic count

Group A is a control negative group. Group B was treated with camel milk. Group C was treated with camel milk and turmeric extract. Group D treated with turmeric extract. Group E treated with cisplatin. Group F treated with camel milk and cisplatin. Group G injected with DENA. Group H injected with DENA and treated with camel milk. Group I injected with DENA and treated with camel milk and turmeric extract. Group J injected with DENA and treated with turmeric extract. Group K injected with DENA and treated with cisplatin. Group L injected with DENA and treated with cisplatin and camel milk

Lipid peroxidation and oxidative stress enzymes

There was a significant difference in Malondialdehyde (MDA) concentration and superoxide dismutase (SOD) activity at 34th week whereas there was no significant difference in MDA or SOD between groups at 38th week. As expressed in **table (13)**, the concentration of MDA was highly elevated in group G injected with DENA and in group J injected with DENA and treated with turmeric extract compared to control group whereas it was moderately elevated in group B treated with camel milk and in group H injected with DENA and treated with camel milk. Moreover the low values of superoxide dismutase activity were observed in group G, K and L. Group K which is injected with DENA and treated with cisplatin revealed the lowest SOD activity compared to control group. It also worth mentioning that group B treated with camel milk exhibited the highest SOD activity compared to the control group.

Table (13): showing results of MDA concentration and SOD activity at the 34th and 38th week post injection of DENA

GP	MDA (nmol/g tissue)		SOD (U/gm tissue)	
	34 w	**38 w**	**34 w**	**38 w**
A	24.89±7.25[a]	25.28±3.49	531.07±3.02[b,c]	409.03±60.44
B	41.42±21.22[a,b,c]	25.59±3.85	580.30±8.46[d]	317.88±36.05
C	27.46±5.14[a]	33.20±7.36	543.64±45.04[b,c]	449.56±93.15
D	33.94±16.71[a,b]	42.37±10.0	524.44±34.04[b,c,d]	411.72±62.39
E	23.94±0.12[a]	43.45±17.18	530.02±5.54[b,c]	389.79±141.53
F	----------	36.98±7.04	541.20±12.70[b,c]	388.81±146.73
G	68.95± 3.0[b,c]	71.06±36.66	424.58±88.81[a,b,c]	418.42±115.92
H	43.06±12.72[a,b,c]	45.52±20.85	536.31±19.46b[b,c]	463.29±66.16
I	36.65±12.75[a,b]	----------	501.39±46.63[b,c,d]	----------
J	77.67±14.65[c]	26.82±0.82	398.04±52.34[a,b]	290.15±4.23
K	17.11±4.1[a]	49.21±6.61	311.45±41.71[a]	358.77±101.09
L	36.5±13.35[a,b]	72.16±25.35	540.5±29.94[b,c]	207.16±35.69

All data presented as mean value ± SE. Values bearing different superscripts (a,b,c,d) are significant at $P < 0.05$. MDA: Malondialdehyde, SOD: superoxide dismutase. Group A is a control negative group. Group B was treated with camel milk. Group C was treated with camel milk and turmeric extract. Group D treated with turmeric extract. Group E treated with cisplatin. Group F treated with camel milk and cisplatin. Group G injected with DENA. Group H injected with DENA and treated with camel milk. Group I injected with DENA and treated with camel milk and turmeric extract. Group J injected with DENA and treated with turmeric extract. Group K injected with DENA and treated with cisplatin. Group L injected with DENA and treated with cisplatin and camel milk

4.6. Gross pathological changes

Livers of rats in the treated groups were apparently larger in size compared to the control group at the 19th and 28th week **(Fig. 1)**. Abnormal focal discolored elevated areas were also detected in some of the groups injected with DENA at 34th week especially in the group injected with DENA and treated with cisplatin at 38th week (**Fig. 2).** Liver of one rat injected with DENA and treated with turmeric extract at the 38th week showed a rounded parenchymatous mass bulging from the ventral surface of the left lateral lobe which measured about 1 cm in diameter (**Fig. 3).**

Gross examination of kidneys showed no pathological changes except in groups injected with cisplatin (E, F, K and L) in which kidneys were small, atrophied and pale in color.

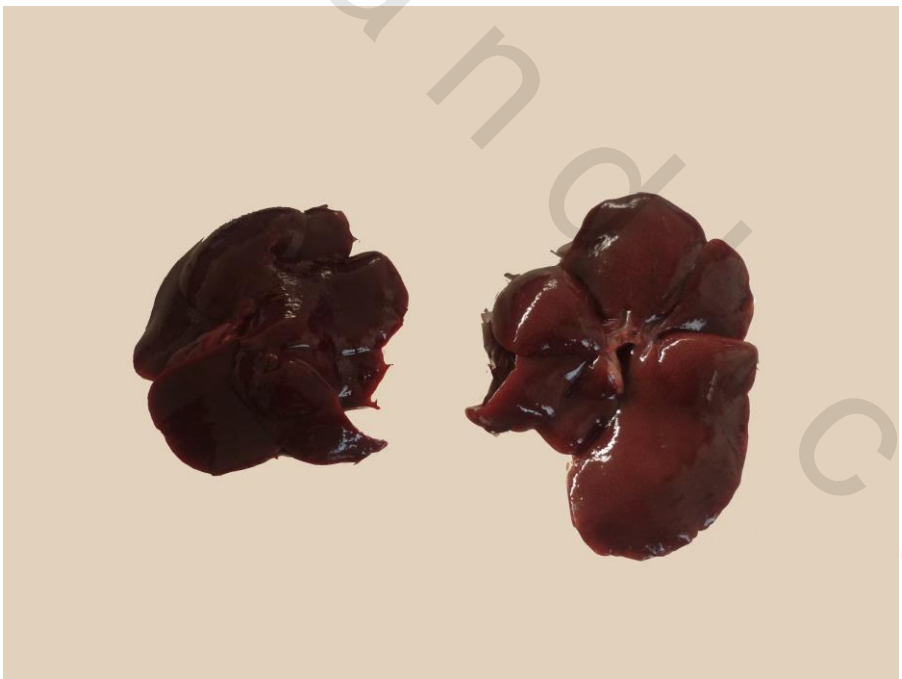

Fig. (1). Liver of rat injected with DENA and administered phenobarbitone at 28th week showing larger size (right side) when compared to the control liver (left side).

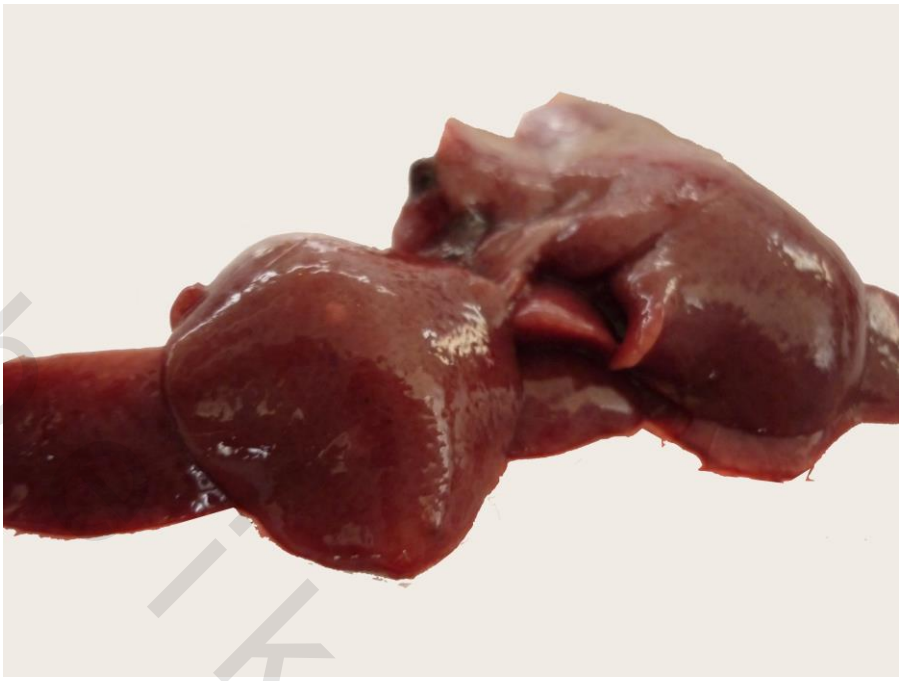

Fig. (2). Liver of rat injected with DENA and treated with cisplatin (38th week) showing multiple discolored focal areas in the right lateral lobe.

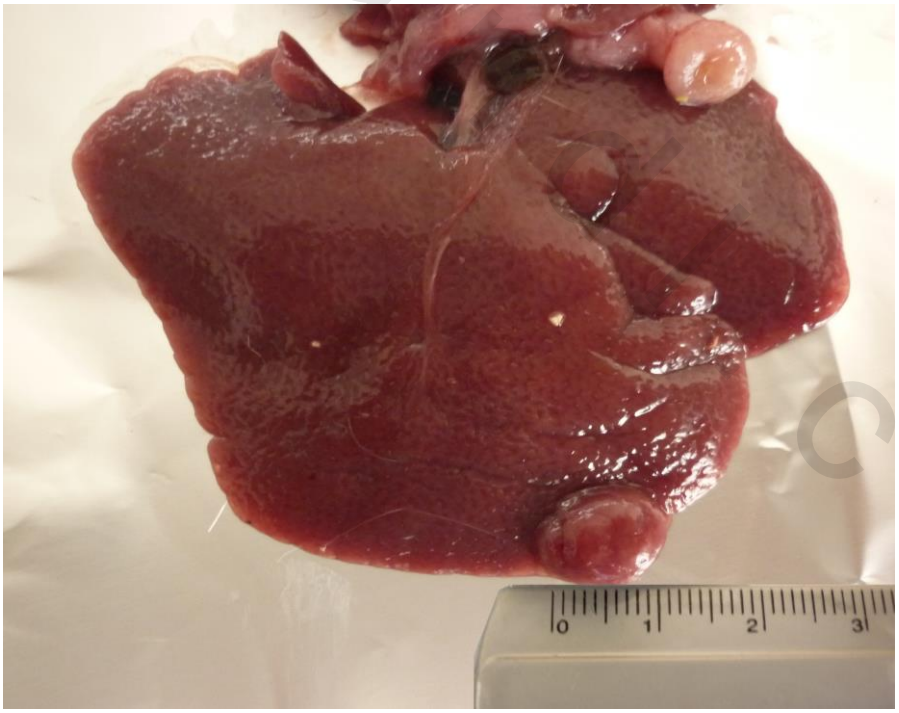

Fig. (3). Liver of rat injected with DENA and treated with turmeric extract (38th week) showing a rounded parenchymatous overgrowth at the periphery of the left lateral lobe which measured about 1 cm in diameter.

4.7. Histopathological findings of the liver

Group 1

The liver of rats in the control group expressed almost no significant histopathological alterations at 19th and 28th week.

Group 2

Microscopically, liver of rats injected with DENA and administered phenobarbitone showed remarkable histopathological alterations at 19 and 28th week. At 19th week, Macrovesicular steatosis was clearly evident (**Fig. 4).** Apoptotic bodies were seen in the hepatic parenchyma with karyocytomegaly of hepatocytes **(Fig. 5).** Hyperplasia of bile duct epithelium in the major portal areas was quite remarkable.

Altered hepatocellular foci were very distinguishable in which foci of cellular alterations were discriminated from the surrounding normal parenchyma. Eosinophilic foci were comprised of hepatocytes typically having increased cytoplasm that stained more eosinophilic than the cytoplasm of surrounding hepatocytes or was lightly stained forming pale bodies (**Fig. 6, 7).**

At 28th week, examined liver of rats showed microsteatosis and foci of hepatocellular alteration. Clear cell foci, eosinophilic foci were demonstrated. The size and number of these foci increased remarkably when compared to those seen in the livers of rats at the 19th week. The hepatocytes in these foci showed karyocytomegaly with either vacuolated cytoplasm in clear cell foci or deeply stained eosinophilic cytoplasm in eosinophilic foci.

The arrangement of hepatocytes within the hepatic cords was distorted in these foci with an obvious demarcation between altered heptocytes within the foci and normal parenchyma. Mitotic figures were also evident in these foci.

Sometimes, deeply eosinophilic globular intracytoplasmic inclusions surrounded by a clear halo, also known as intracellular hyaline bodies, were observed in the cytoplasm of these altered cells (**Fig. 8)**. Nuclear atypia of hepatocytes was clear. Hepatic sinusoids were usually compressed and were difficult to distinguish in altered hepatocellular foci.

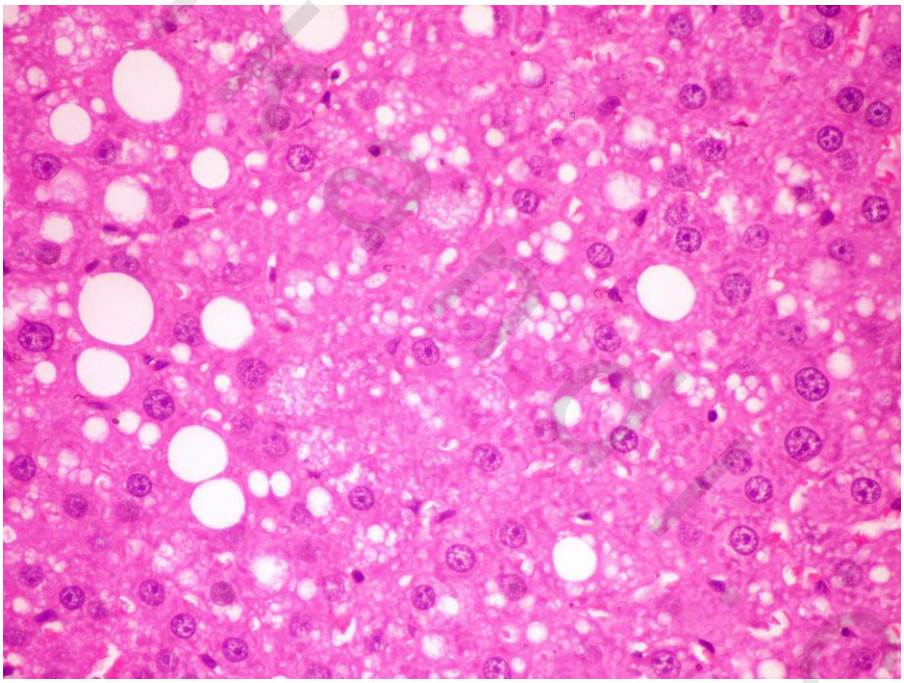

Fig. (4). Liver of rat injected with DENA and administered Phenobarbitone (19 weeks) showing macrovesicular steatosis and karyomegaly of hepatocytic nuclei (H and E stain X 400).

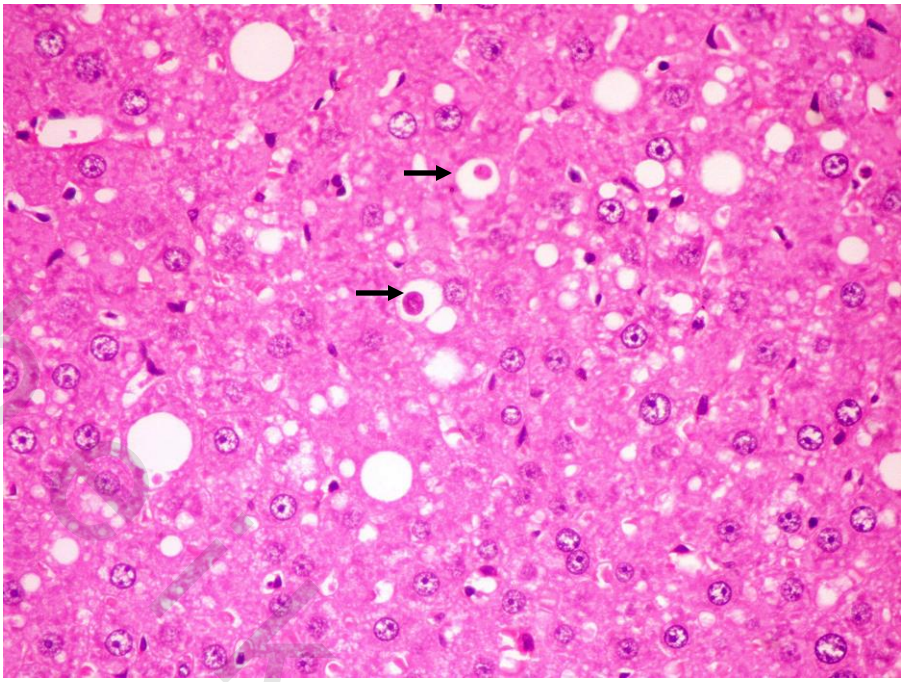

Fig. (5). Liver of rat injected with DENA and administered Phenobarbitone (19 weeks) showing apoptotic bodies (arrows), macrovesicular and microvesicular steatosis of hepatocytes (H and E stain X 400).

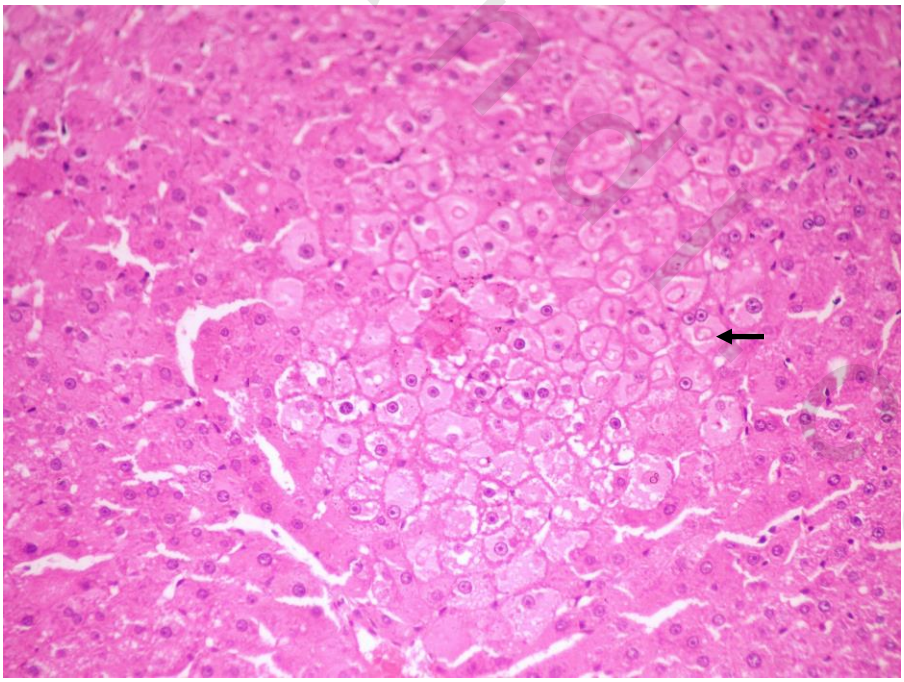

Fig. (6). Liver of rat injected with DENA and administered Phenobarbitone (19 weeks) showing a large irregular eosinophilic focus with light pink staining of the cytoplasm. Note the presence of pale bodies (arrows) in hepatocytes (H and E stain X 200).

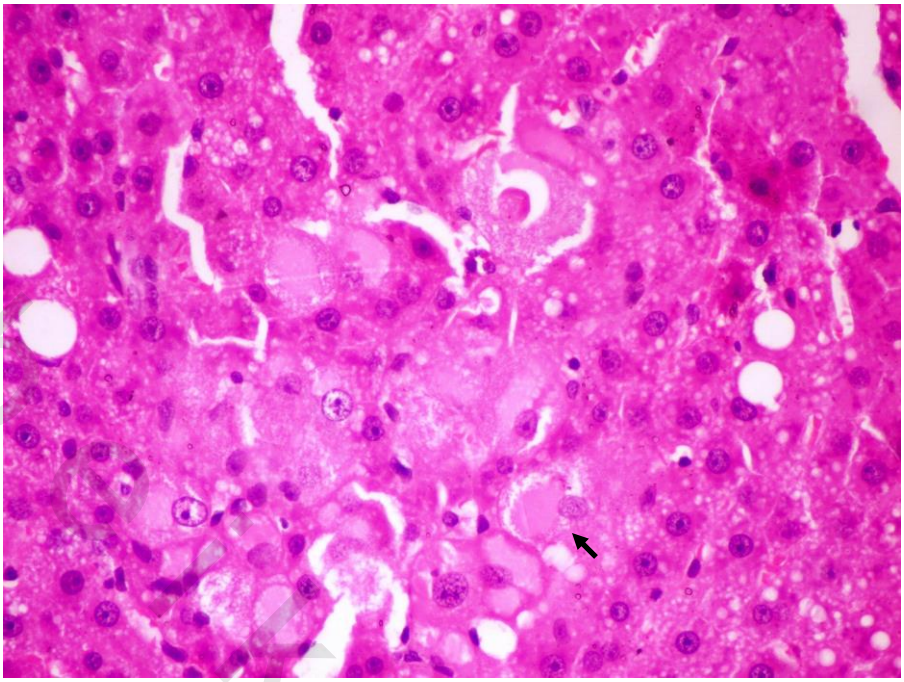

Fig. (7). Liver of rat injected with DENA and administered Phenobarbitone (19th week) showing altered hepatocellular focus. Note the presence of pale bodies (arrow) in hepatocytes (H and E stain X 400).

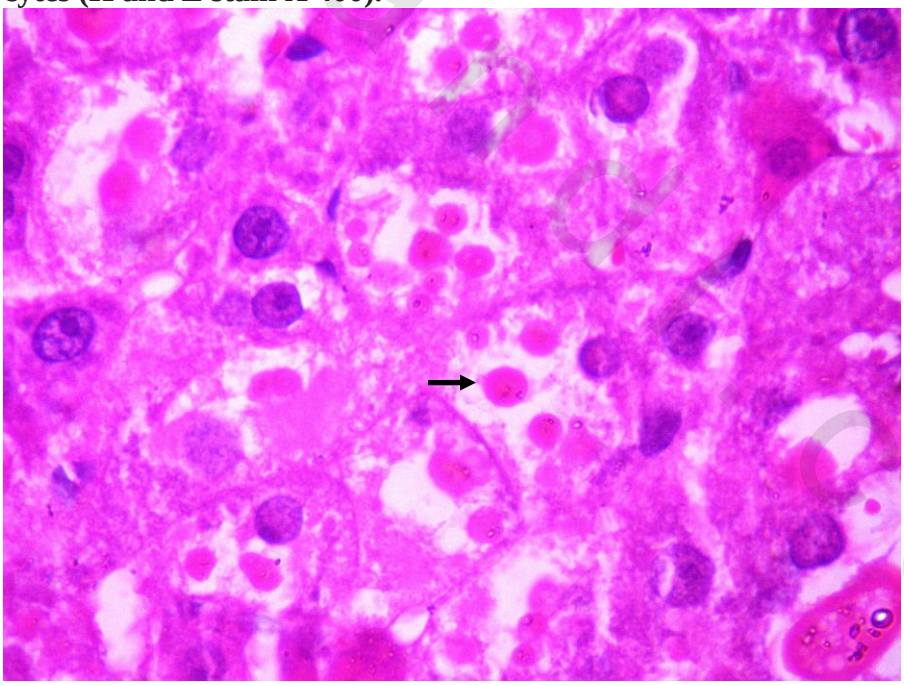

Fig. (8). Liver of rat injected with DENA and administered Phenobarbitone (28th week) showing eosinophilic globular intracytoplasmic inclusions (arrow) (H and E stain X 1000).

A. At 34th week

The rats in groups A, B, C and D exhibited a normal hepatic architecture with no histopathological alterations

Group E

Livers of rat treated with cisplatin only (34th week) showed fibroplastic proliferation of its capsule and congestion of subcapsular hepatic sinusoids (**Fig. 9)** in addition to subcapsular hemorrhage (**Fig. 10).** Congestion and dilatation of sinusoids besides kupffer cell activation were demonstrated in the hepatic parenchyma**.** Moreover, there was eosinophilic cell infiltration (**Fig. 11)** and mucoid degeneration in the portal area (**Fig. 12).**

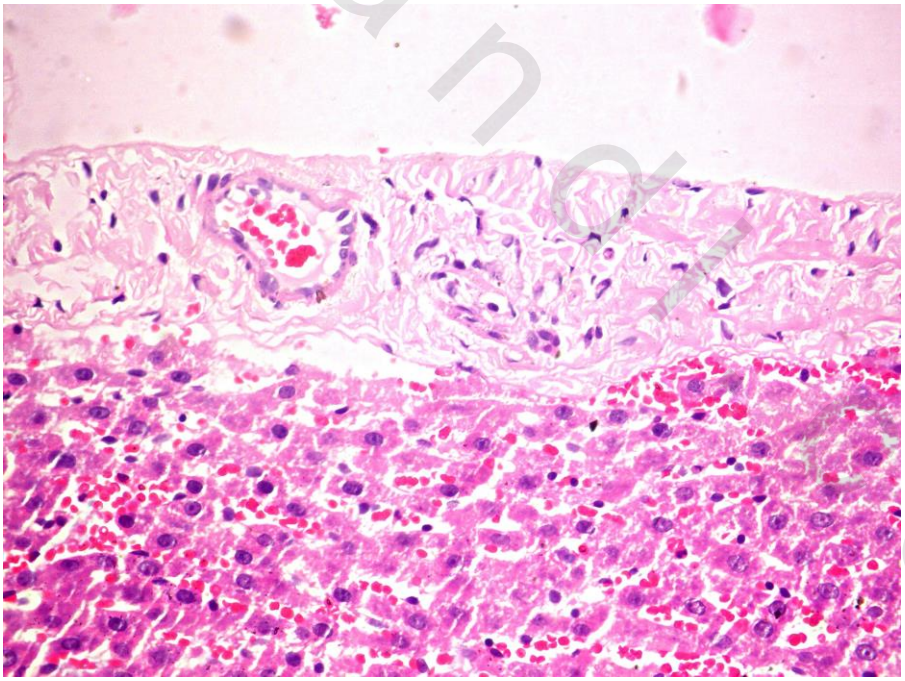

Fig. (9). Liver of rat treated with cisplatin (34th week) showing fibroblastic proliferation of the capsule and congestion of subcasular hepatic sinusoids (H and E stain X 400).

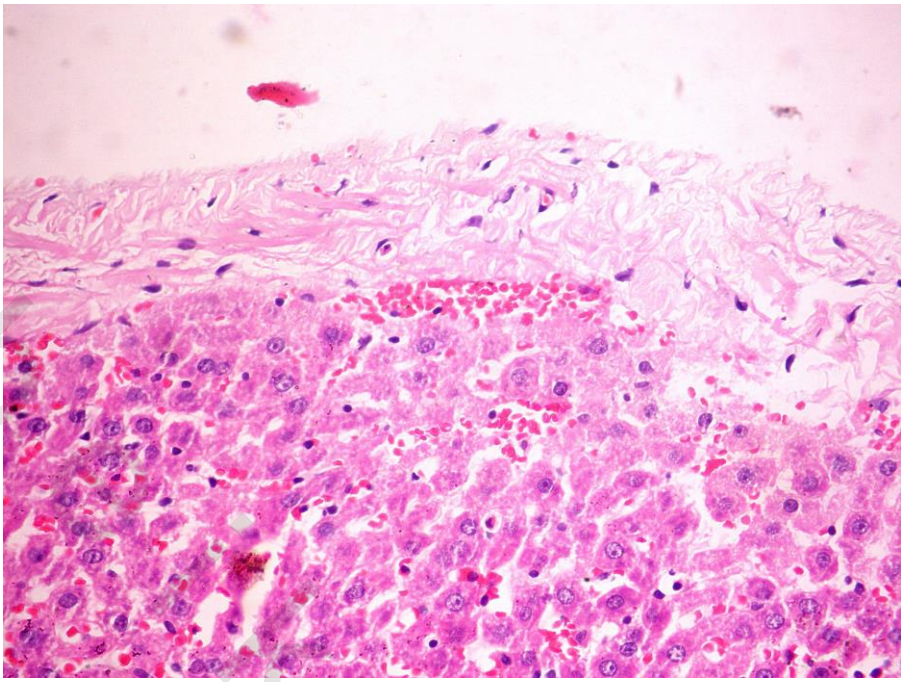

Fig. (10). Liver of rat treated with cisplatin (34th week) showing fibroblastic proliferation of the capsule and subcapsular hemorrhage (H and E stain X 400).

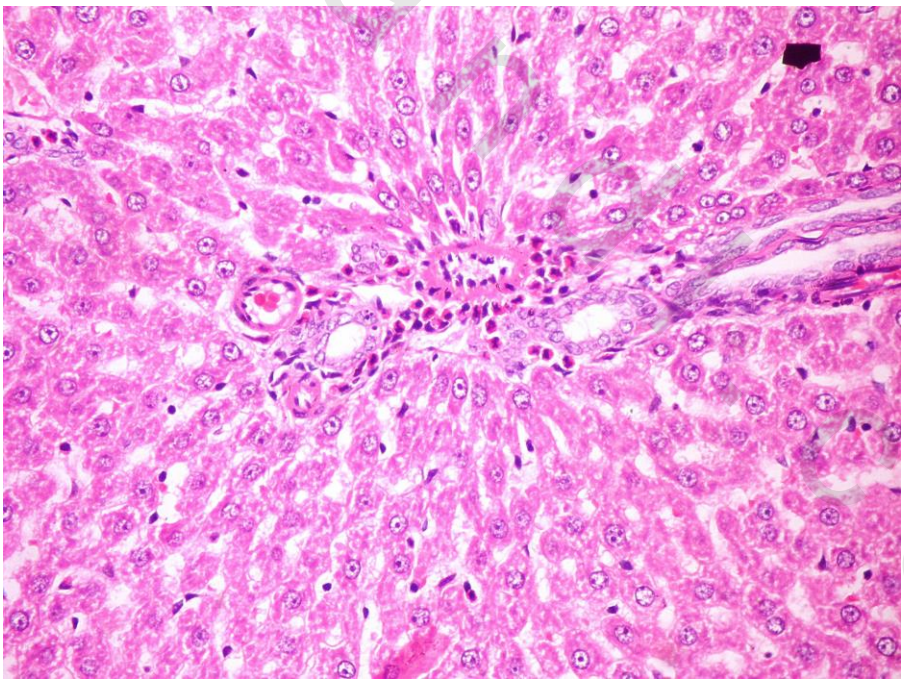

Fig. (11): Liver of rat treated with cisplatin (34th week) showing eosinophilic cell infiltration in the portal area (H and E stain X 400).

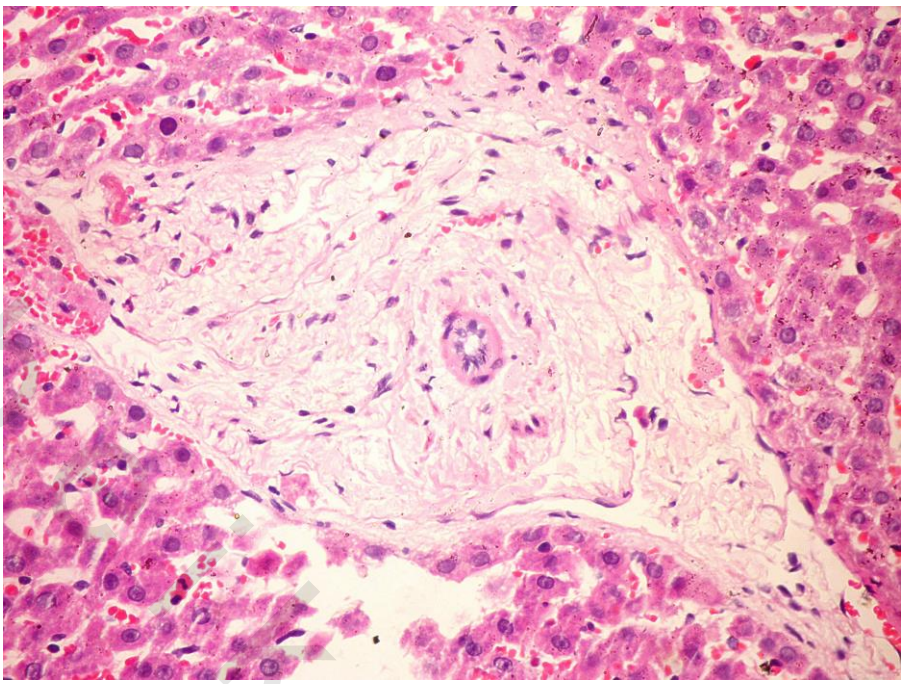

Fig. (12). Liver of rat treated with cisplatin (34th week) showing mucoid degeneration in the portal area (H and E stain X 400).

Group F

Histopathological examination of livers of rats treated with cisplatin and camel milk (34th week) showed small focal areas of necrosis associated with mononuclear inflammatory cell infiltration. Remarkably, eosinophilic cells infiltrations as well as portal edema accompanied with inflammatory cell infiltration were observed in the portal areas**.** On the other hand, the congestion and hemorrhage in the portal areas subsided in this group compared to previous group

Group G

At 34th week, liver of rats injected with DENA (control positive group) exhibited small, medium and large sized altered foci. Clear cell foci are characterized by relatively clear cytoplasm or cytoplasm with just a hint of very pale eosinophilic staining and wispy strands of cytoplasm making the

cytoplasmic vacuoles have an indistinct border. Many cells within a clear cell focus have a centrally located nucleus with central nucleoli. Well delineated clear cell foci were distinguishable from the normal parenchyma (**Fig. 13).** The number of eosinophilic foci increased compared to those seen in rat's liver of the second euthansia. Small basophilic foci comprised of small hepatocytes with basophilic cytoplasm were also demonstrated (**Fig. 14).** Moreover, karyomegaly of hepatocytes and mitotic figures were seen in altered hepatocellular foci.

Large clear hepatocellular adenoma with multiple mitotic divisions at the periphery was evident (**Fig. 15, 16).** The hepatocellular adenoma appeared as well-circumscribed nodule that consists of sheets of hepatocytes only 1-2 cell thick plates with a bubbly vacuolated cytoplasm. It was well demarcated by compression of the adjacent tissue and altered staining properties and growth pattern of a neoplasm. Few necrotic cells and multiple apoptotic bodies were also observed. Cholangioma supported by fibroplasia was trapped at the periphery of this hepatocellular adenoma (**Fig. 17)**.

Focal areas of hepatocyte dissociation and sinusoidal dilatation (peliosis hepatis) which were sometimes infiltrated with mononuclear inflammatory cells as well as oval cell hyperplasia in the portal area were also detected (**Fig. 18).**

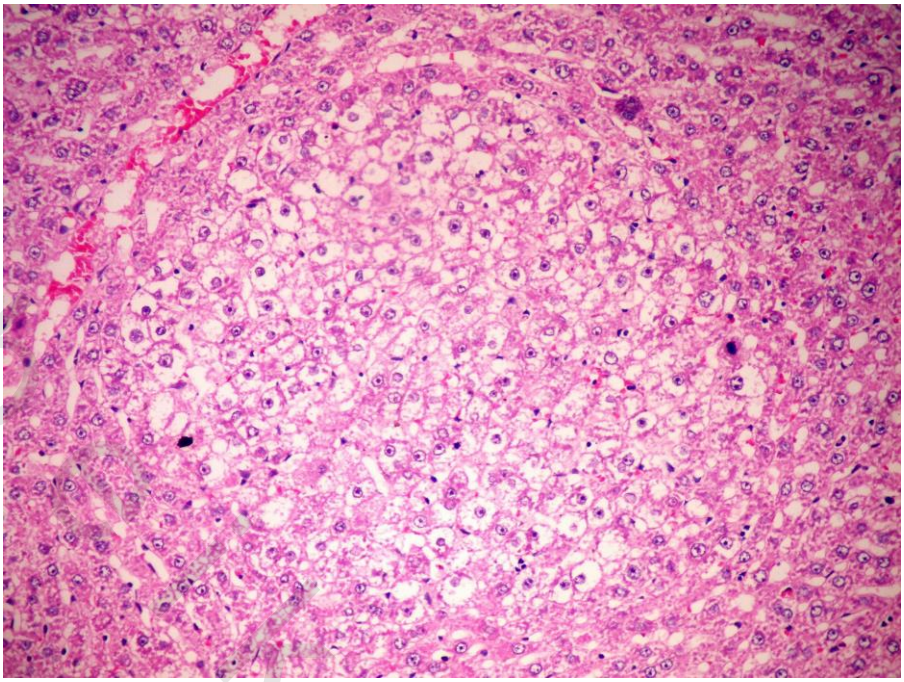

Fig. (13). Liver of rat injected with DENA (34th week) showing a well delineated medium sized clear focus of cellular alteration with compression of normal hepatic parenchyma (H and E stain X 200).

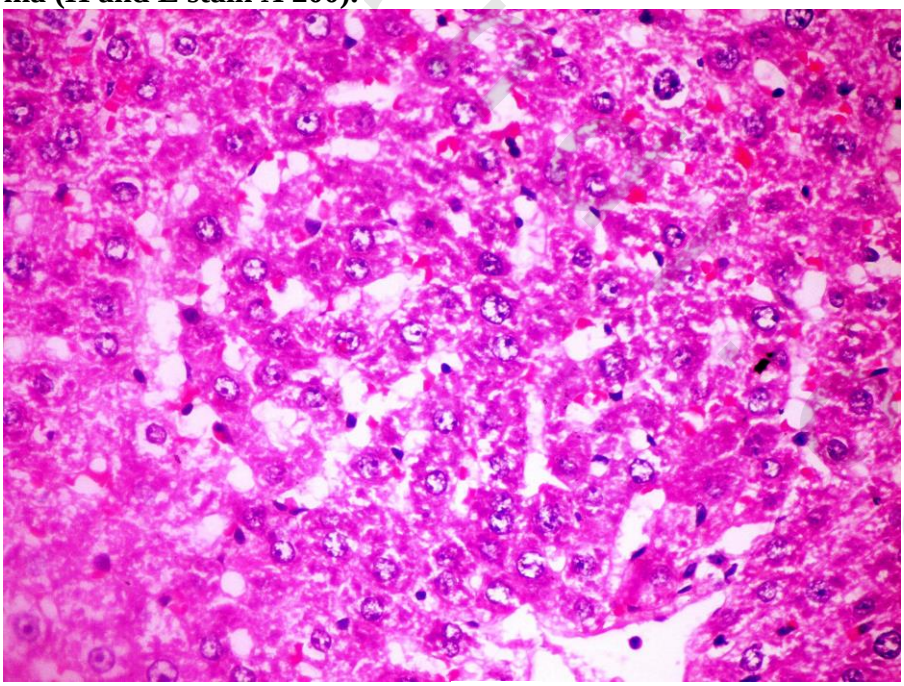

Fig. (14). Liver of rat injected with DENA (34th week) showing hepatocyte dissociation in a basophilic focus of cellular alteration (H and E stain X 200).

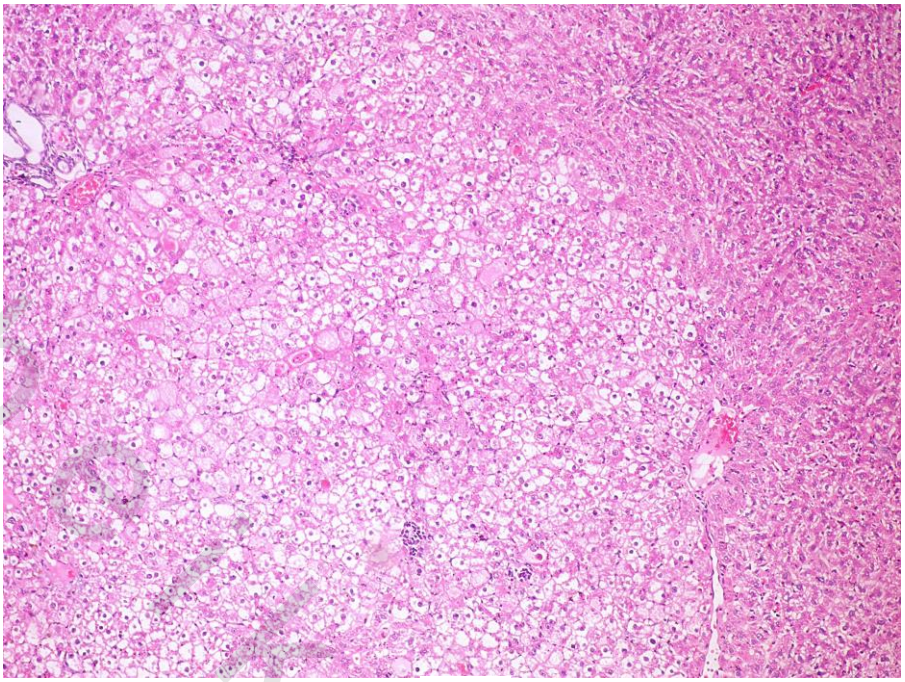

Fig. (15). Liver of rat injected with DENA (34th week) showing hepatocellular adenoma. Notice the compression of adjacent normal parenchyma (H and E stain X 100).

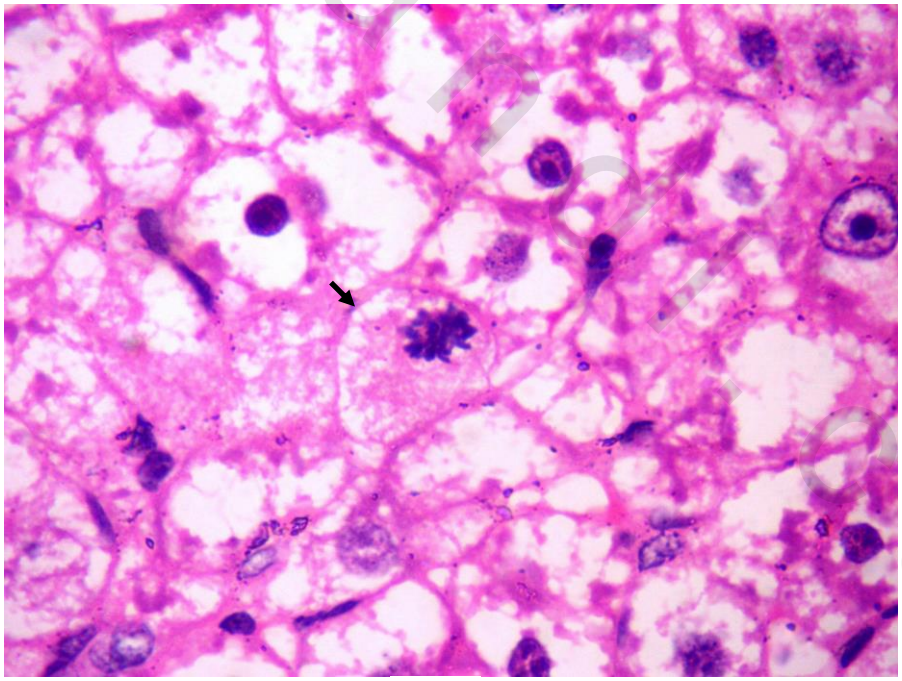

Fig. (16): Liver of rat injected with DENA (34th week) showing mitotic figures in clear cell hepatocellular adenoma. Notice Karyomegaly, central nucleoli and margination of chromatin in hepatocytes (H and E stain X 1000).

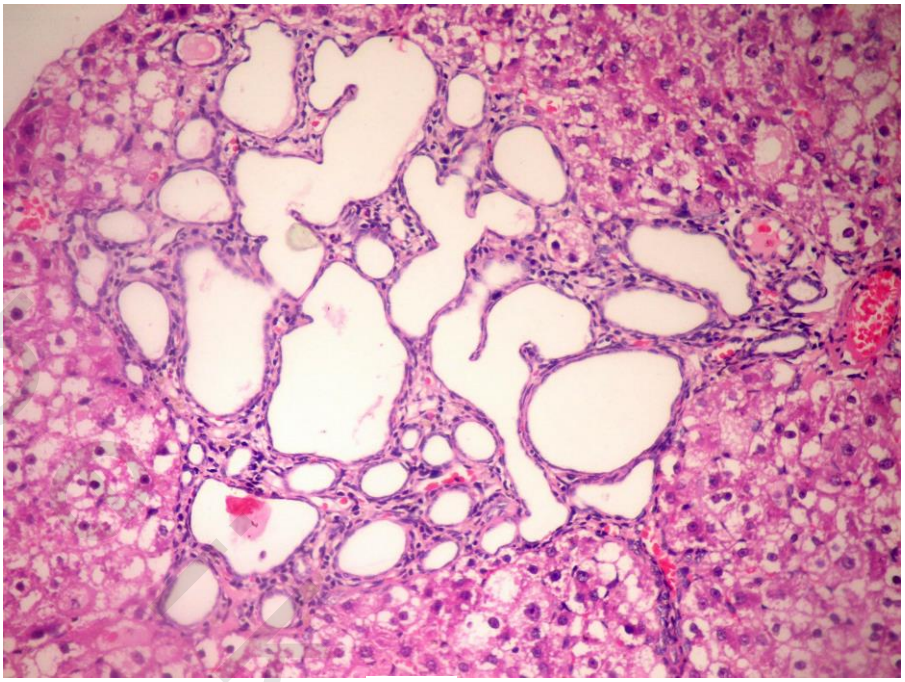

Fig. (17). Liver of rat injected with DENA (34th week) showing cholangioma (H and E stain X 200).

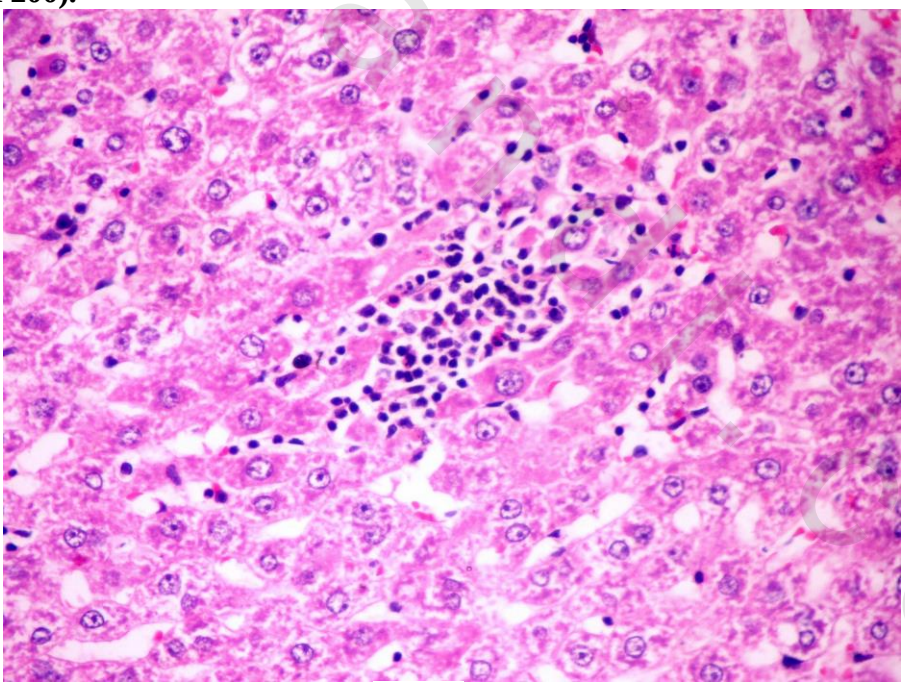

Fig. (18). Liver of rat injected with DENA (34th week) showing hepatic dissociation with small necrotic area infiltrated with mononuclear inflammatory cell infiltration (H and E stain X 400).

Group H

Liver of rats injected with DENA and treated with camel milk for 6 weeks showed the appearance of hepatic altered foci of the clear, eosinophilic and mixed type. Neither basophilic foci nor hepatocellular adenoma were noticed. Significantly, the number and size of these foci were lesser than those detected in the control positive group (group G). Most of these foci showed decrease of cellular density and increase of single cell necrosis (**Fig. 19).** The altered foci exhibited decrease of cellular atypia. Foca areas of necrosis were seen especially in areas showing nuclear hyperactivity. The necrotic foci were infiltrated with mononuclear cells (**Fig. 20).** There was increase in hepatocellular apoptosis. The mean area of altered hepatocellular foci in this group was lower than that of group G (**Chart 2).**

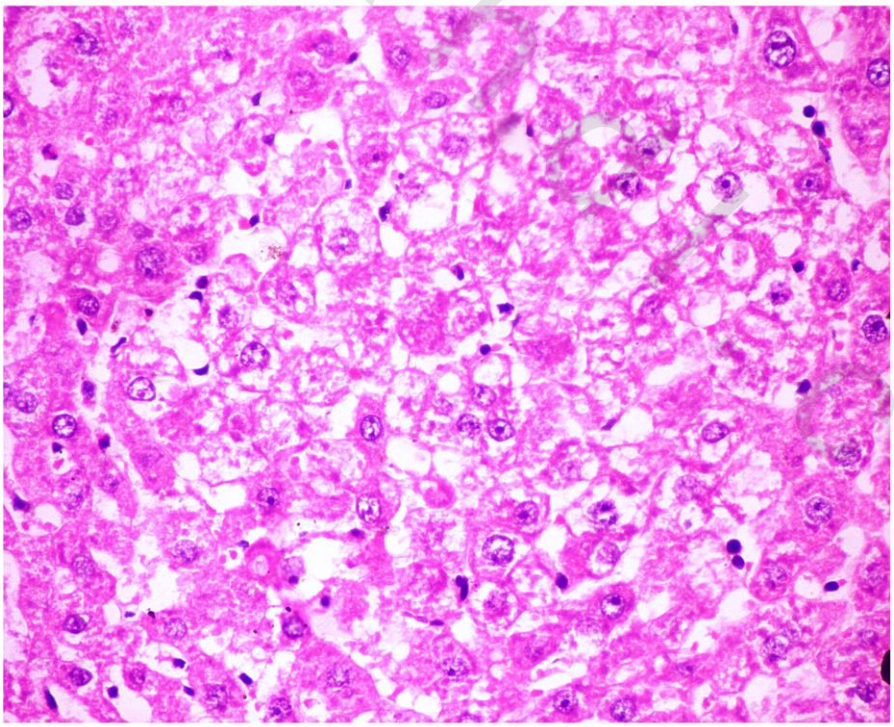

Fig. (19). Liver of rat injected with DENA and treated with camel milk for 6 weeks (34th week) showing small altered hepatic foci with decreased cellular density and increase single cell necrosis (H and E stain X 400).

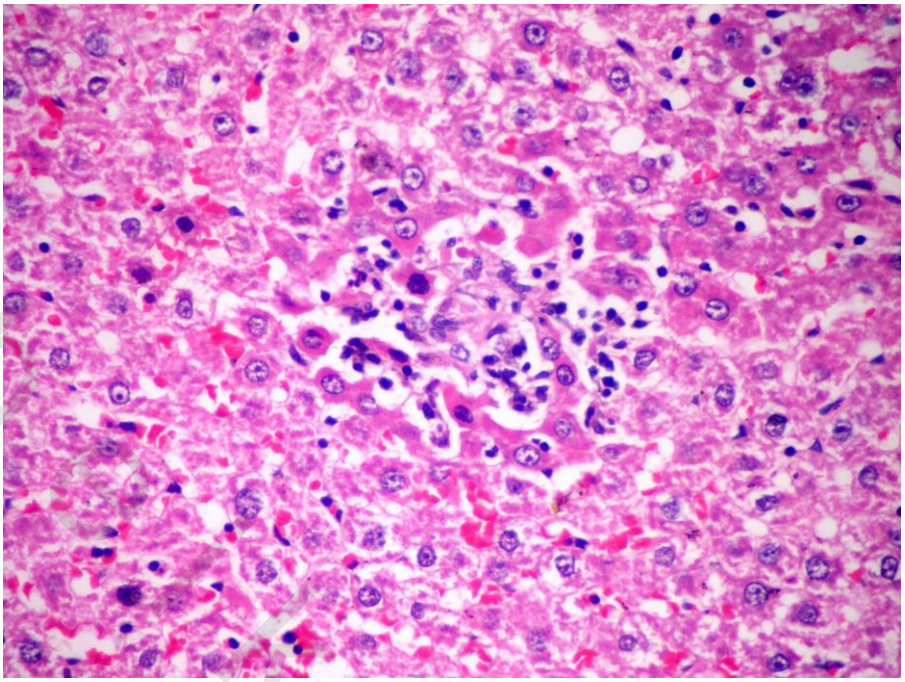

Fig. (20). Liver of rat injected with DENA and treated with camel milk for 6 weeks (34th week) showing focal area of necrosis associated with inflammatory cells infiltration (H and E stain X 400).

Group I

Liver of rats injected with DENA and treated with both camel milk and turmeric extract for 6 weeks showed mostly small sized hepatocellular altered foci**.** Never the less, one clear solid hepatocellular adenoma was demonstrated. This group revealed a more decrease in the mean area of hepatocellular altered foci than group H which is treated with milk alone **Chart (2).** Apoptotic bodies were seen at the periphery of altered hepatic foci (**Fig. 21).** The altered hepatocellular foci showed decrease in the cellular density (**Fig. 22).** Few mitotic figures were seen in the altered hepatocellular foci (**Table 14).** Intracellular hyaline bodies and apoptotic bodies in altered hepatocellur foci were seen (**Fig. 23).** Focal areas of spongiosis hepatis which appeared as multilocular cystic lesion containing a finely granular or flocculent eosinophilic material (**Fig. 24)** and peliosis hepatis also known as sinusoidal dilatation were also demonstrated.

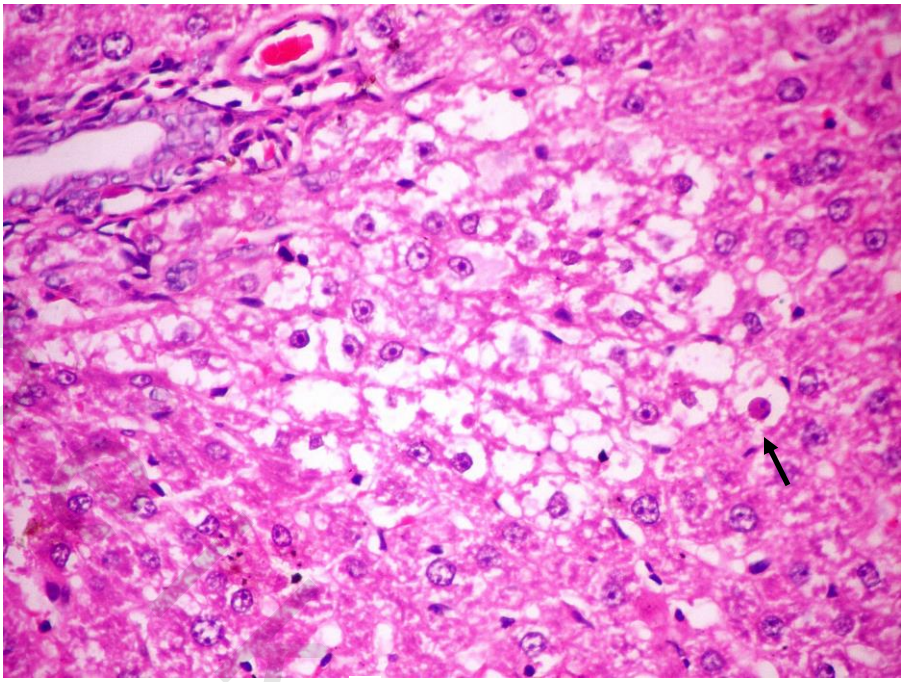

Fig. (21). Liver of rat injected with DENA and treated with camel milk and turmeric extract for 6 weeks (34th week) showing small clear cell focus with apoptotic body at the periphery (arrow) (H and E stain X 400).

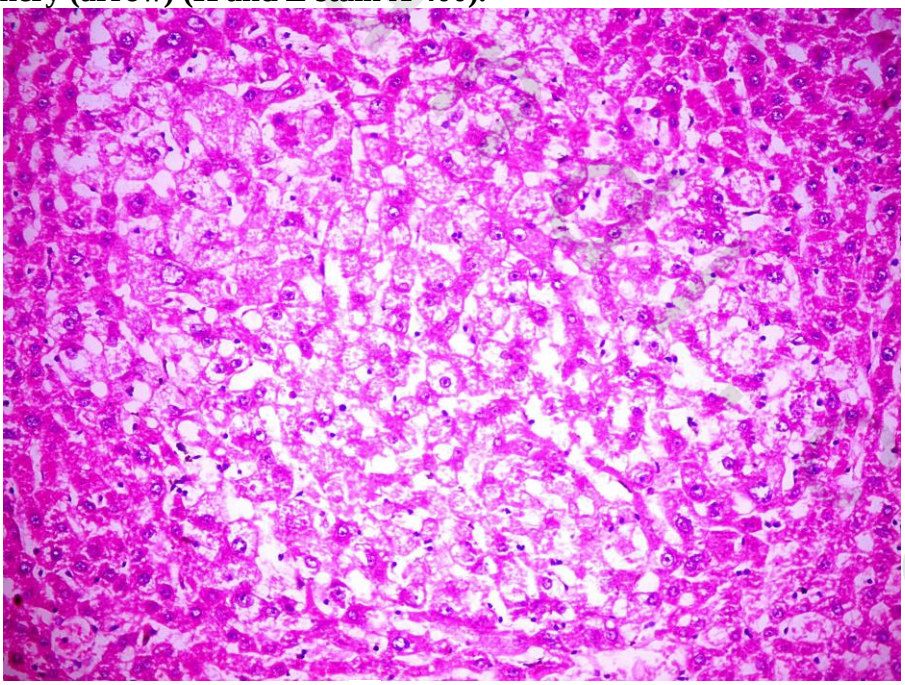

Fig. (22). Liver of rat injected with DENA and treated with camel milk and turmeric extract for 6 weeks (34th week) showing medium sized mixed hepatocellular alteration with decrease in the cellular density (H and E stain X 200).

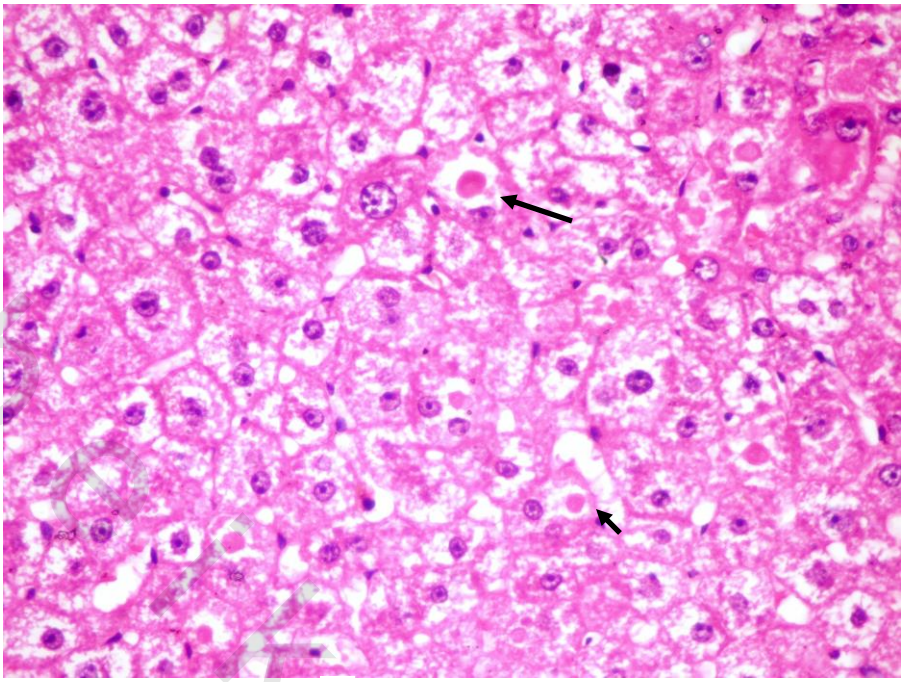

Fig. (23): Liver of injected with DENA and treated with camel milk and turmeric extract for 6 weeks (34th week) showing apoptotic bodies (arrows) in altered hepatocellur focus (H and E stain X 400).

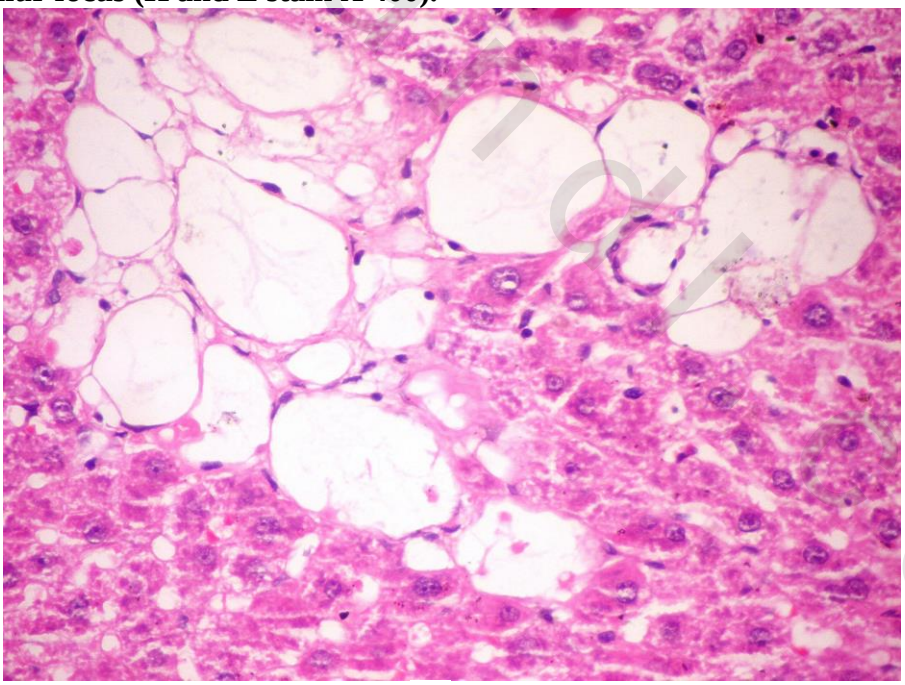

Fig. (24): Liver of rat injected with DENA and treated with camel milk and turmeric extract for 6 weeks (34th week) showing spongiosis hepatis or cystic degeneration (H and E stain X 400).

Group J

Liver of rats injected with DENA and treated with turmeric extract for 6 weeks (34th week) showed the presence of clear cell foci (**Fig. 25),** eosinophilic foci**,** clear and eosinophilic hepatocellular adenoma. The altered hepatic cell foci exhibited nuclear atypia. The eosinophilic hepatocellular adenoma was composed of normal sized or slightly enlarged hepatocytes with eosinophilic or pale staining cytoplasm that was arranged in closely approximated plates one to two cells thick. The cells are separated by compressed sinusoids which may be irregularly or focally dilated **(Fig. 26).** This group showed the least improvement in the mean area of hepatocellular foci compared to control positive group (group G) (**Chart 2).** Apoptotic bodies were seen at the periphery of altered foci. Moreover, focal hepatic necrosis associated with mononuclear inflammatory cell infiltration was demonstrated as distinct foci in the hepatic parenchyma**.** Spongiosis hepatis or cystic degeneration was prominent and appeared as a multilocular cystic lesion containing a finely granular or flocculent eosinophilic material was demonstrated as well (**Fig. 27).**

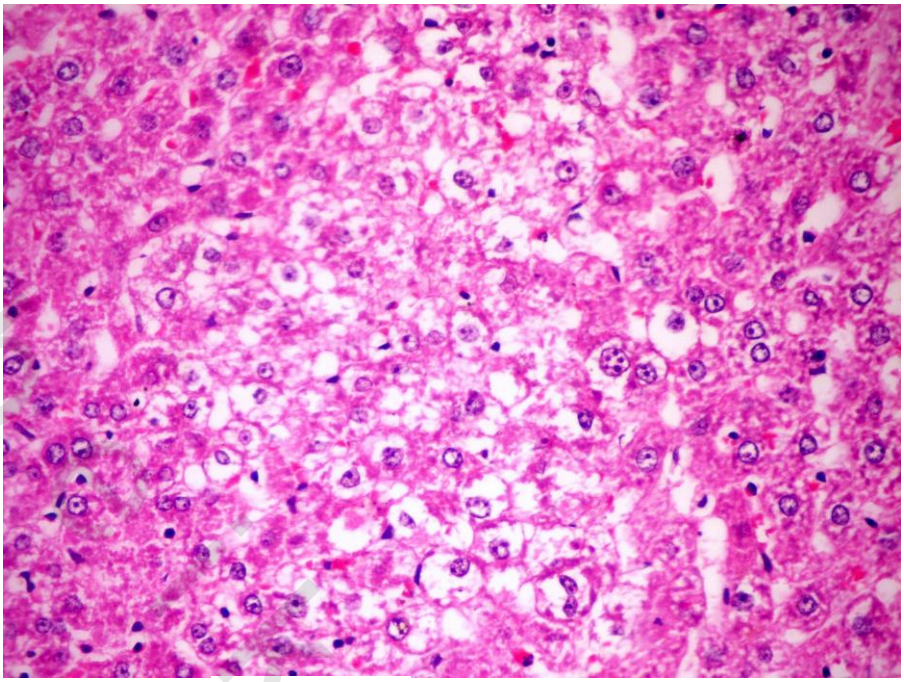

Fig. (25): Liver of rat injected with DENA injection and treated with turmeric extract for 6 weeks (34th week) showing altered hepatocellular focus. Notice the nuclear atypia with karyomegaly and multiple nucleoli (H and E stain X 400).

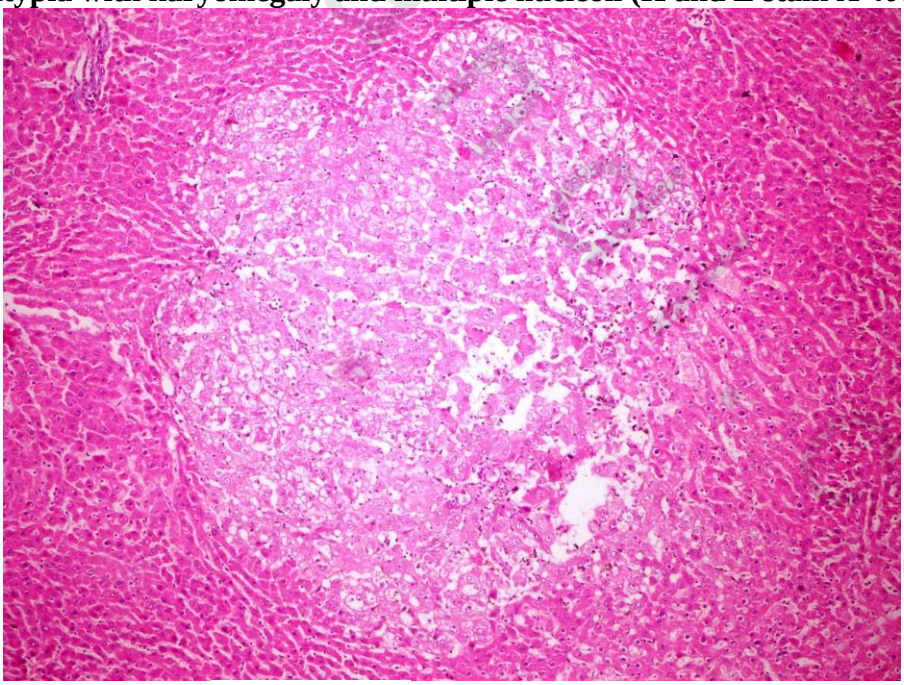

Fig. (26): Liver of rat injected with DENA injection and treated with turmeric extract for 6 weeks (34th week) showing eosinophilic solid hepatocellular adenoma (H and E stain X100).

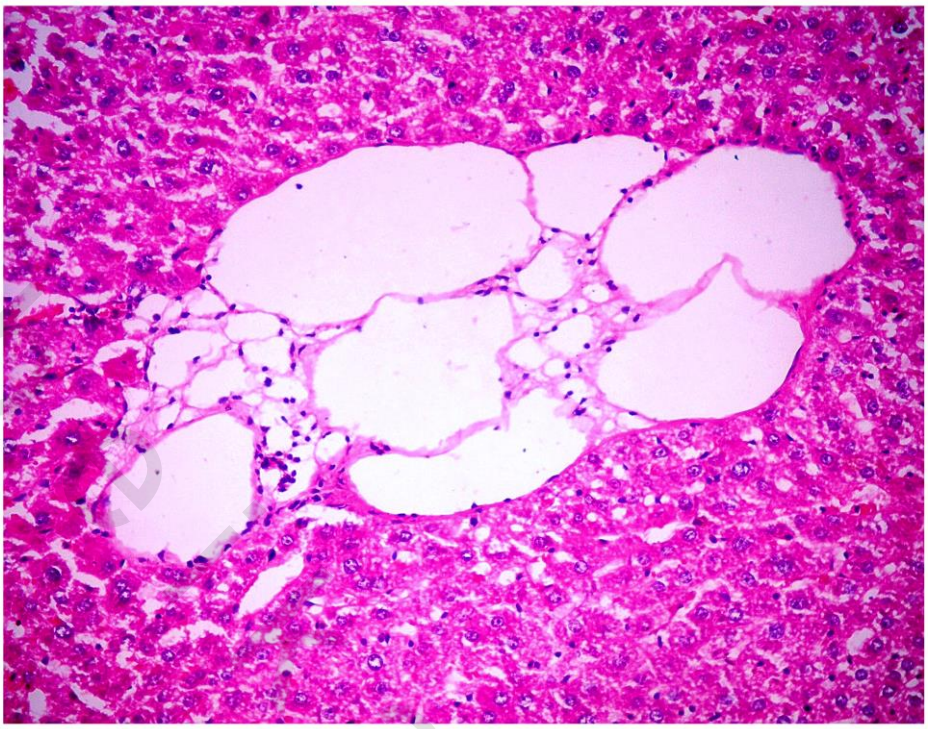

Fig. (27): Liver of rat injected with DENA injection and treated with turmeric extract for 6 weeks (34th week) showing spongiosis hepatis or cystic degeneration with characteristic flocculent material (H and E stain X200).

Group K

Histopathological examination of livers of rats injected with DENA and treated with cisplatin (34th week) showed foci of hepatocellular alterations with or without Mitotic figures (**Fig. 28, 29)** and hepatocellular adenoma. However, the mean area of altered hepatocellular foci was lower than the control positive group (**Chart 2).** Apoptosis as well as focal massive necrosis of hepatocytes were seen. Necrosis associated with mononuclear inflammatory cells infiltration as well as sinusoidal leukocytosis were evident in the hepatic parenchyma. Remarkably, congestion, periportal hemorrhages and eosinophilic cells infiltration in the portal area were observed almost in all examined sections (**Fig. 30, 31).** Sinusoidal dilatation or peliosis hepatis were also evident in this group.

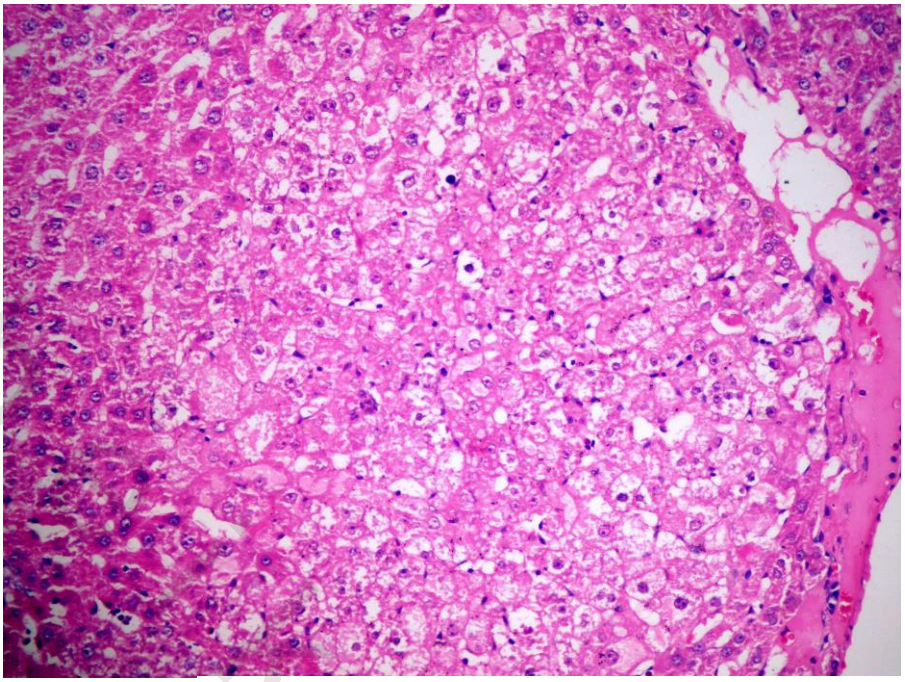

Fig. (28). Liver of rat injected with DENA and treated with cisplatin (34th week) showing medium sized eosinophilic focus with mitotic figure at the periphery (H and E stain X 200).

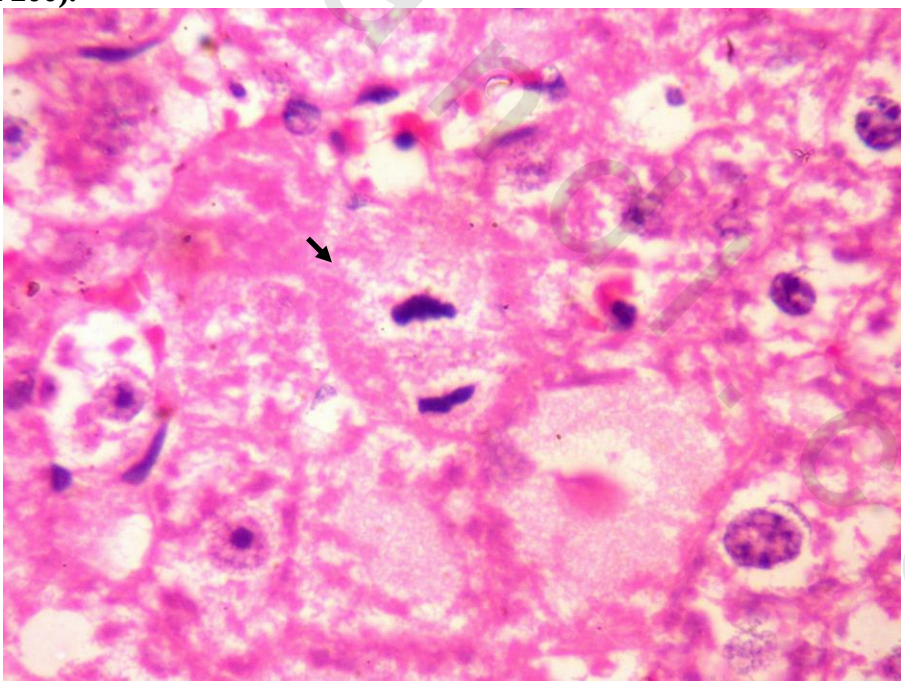

Fig. (29). Liver of rat injected with DENA and treated with cisplatin (34th week) showing mitotic figure (arrow) in an eosinophilic altered foci (H and E stain X 1000).

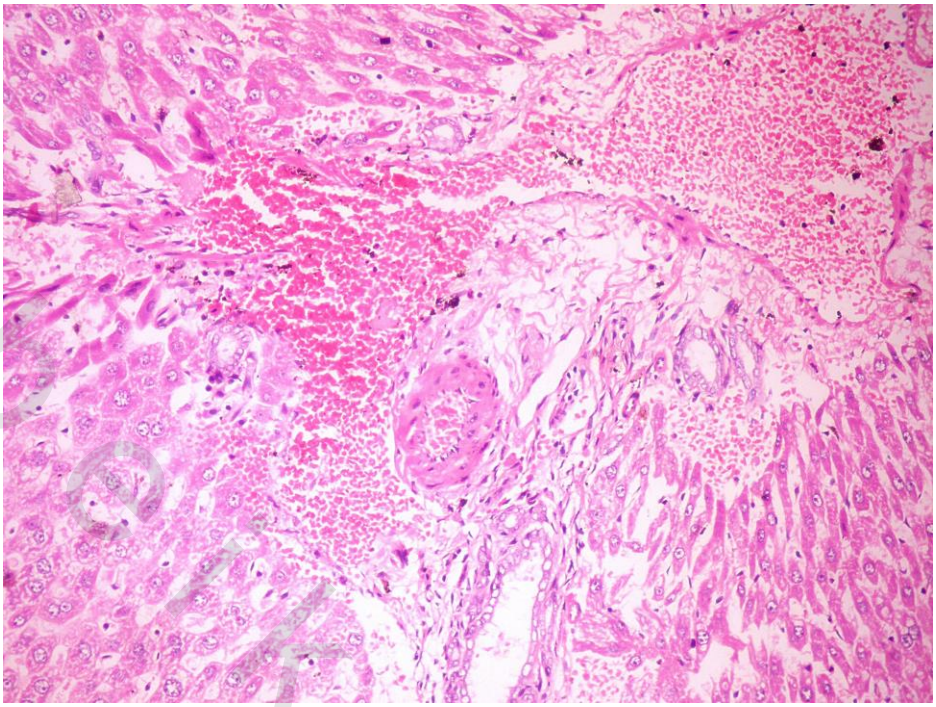

Fig. (30). Liver of rat injected with DENA and treated with cisplatin (34th week) showing congestion and portal hemorrhages (H and E stain X 200).

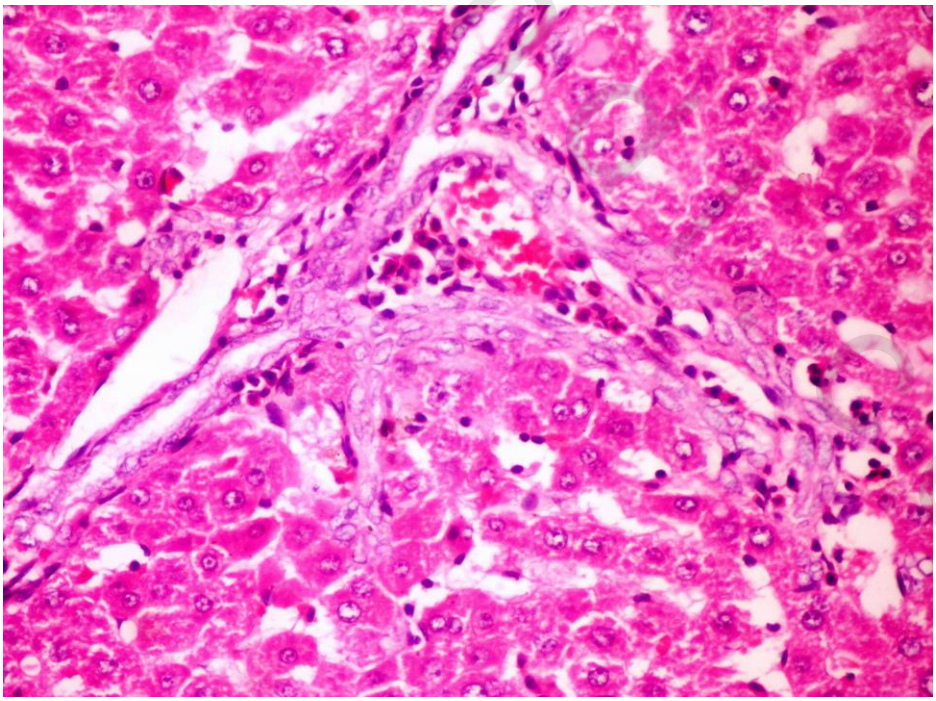

Fig. (31). Liver of rat injected with DENA and treated with cisplatin (34th week) showing eosinophilic cells infiltration in the portal area (H and E stain X 400).

Group L

Livers of rats injected with DENA and treated with cisplatin and camel milk (34th week) showed the presence of altered hepatocellular foci which were mostly small sized clear cell (**Fig. 32)** and eosinophilic foci (**Fig. 33).** The number of these foci was lower than in other groups and no mitotic figures were detected (**Table 14)**. Moreover, this group recorded the lowest mean area for the hepatocellular foci compared to other groups (**Chart 2).** Few necrotic cells were seen in this group compared to the previous one which was treated by cisplatin only. Interestingly, no hemorrhages were seen in this group.

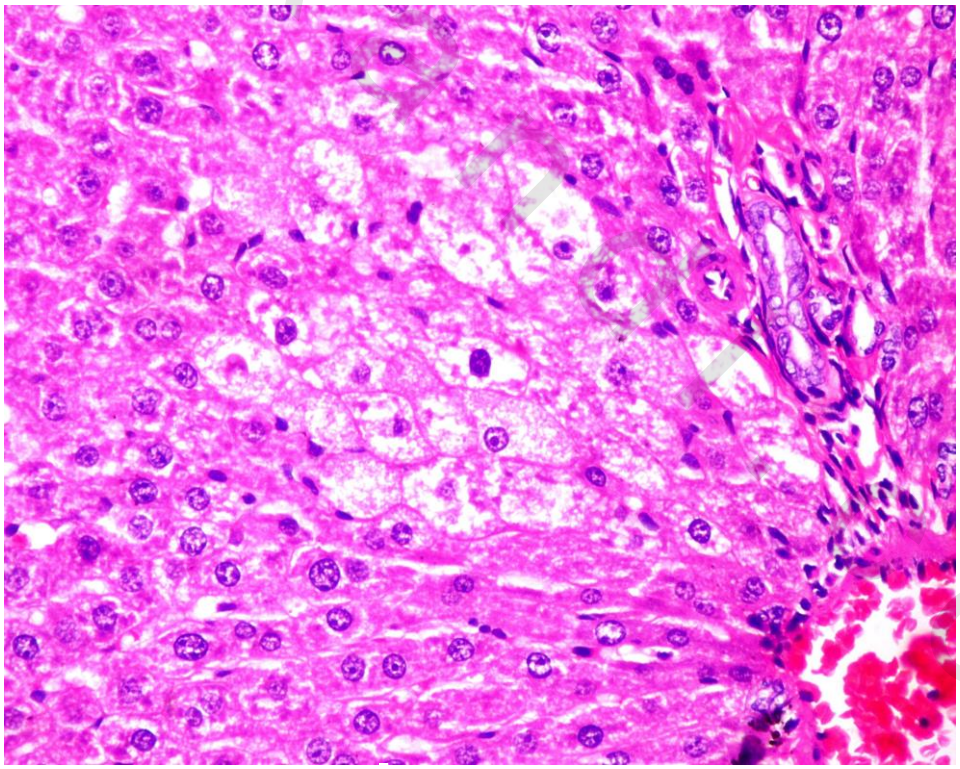

Fig. (32). Liver of rat injected with DENA and treated with cisplatin and camel milk (34th week) showing small clear cell focus of hepatocellular alteration (H and E stain X 400).

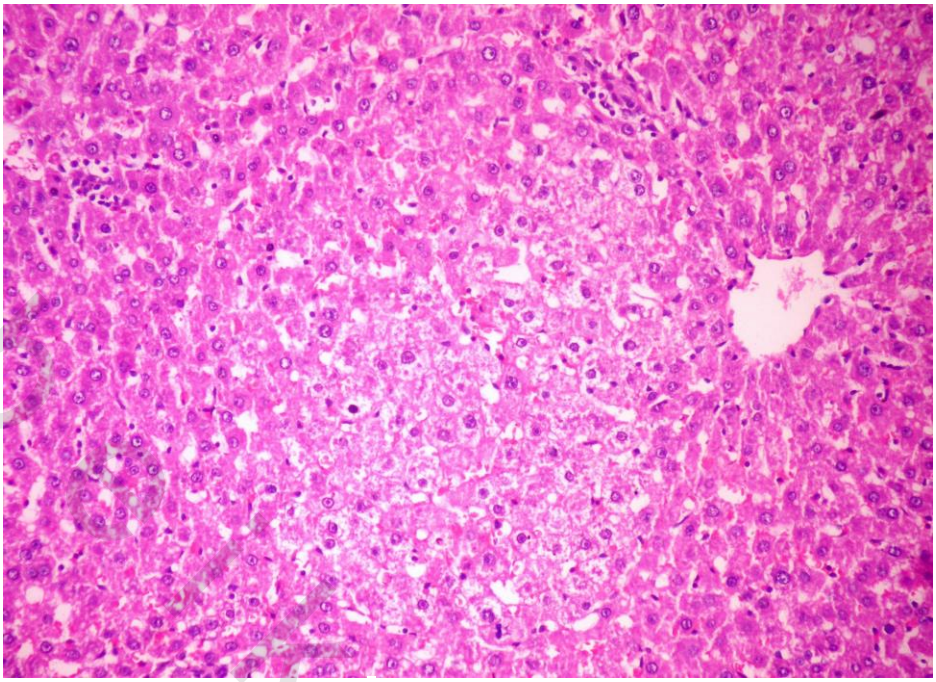

Fig. (33). Liver of rat injected with DENA and treated with cisplatin and camel milk (34th week) showing small eosinophilic focus of hepatocellular alteration (H and E stain X 200).

Lesion score of hepatocellular altered foci at 34th week

As presented in table 14, there was a remarkable improvement in group L injected with DENA and treated with camel milk and cisplatin since there was decrease in number and size of clear cell foci and eosinophilic foci compared to group G. Moreover, basophilic foci, hepatocellular adenoma and mitotic figure were absent in this group. Group H treated with camel milk as well exhibited low number of mitotic figures and no basophilic foci or hepatocellular adenoma compared to group G. Group I treated with camel milk and turmeric extract showed no basophilic foci and decreased in size of altered hepatic foci with decrease numbers of mitotic figures compared to group J treated with turmeric extract only.

Table (14): showing the lesion score of liver histopathology at 34th week

GP	CF	EF	BF	HCA	SIZE	MF
G	13±6.55	7.00±4.04	0.33±0.33	0.33±0.33	1.66±0.33	3.00±2.00
H	9.66±6.11	8.00±4.00	000±000	000±000	1.33±0.33	1.33±1.33
I	15.33±7.21	7.00±1.15	000±000	0.33±0.33	1.33±0.33	1.00±1.00
J	14.00±4.58	7.66±5.3	1.00±000	0.66±0.33	2.00±000	2.00±0.57
K	5.00±1.00	13.00±3.05	000±000	0.66±0.33	1.33±0.33	1.00±0.57
L	1.66±1.20	5.66±2.1	000±000	000±000	0.33±0.33	000±000

CF: clear cell foci, EF: eosinophilic cell foci. BF: basophilic foci. HCA: hepatocellular adenoma. MF: mitotic figure.

The mean area of altered hepatocellular foci at 34th week

This image analysis estimate mean area of altered foci per tissue section in each group. The chart declare that group L recorded the best improvement between the experimental groups followed by group I and H

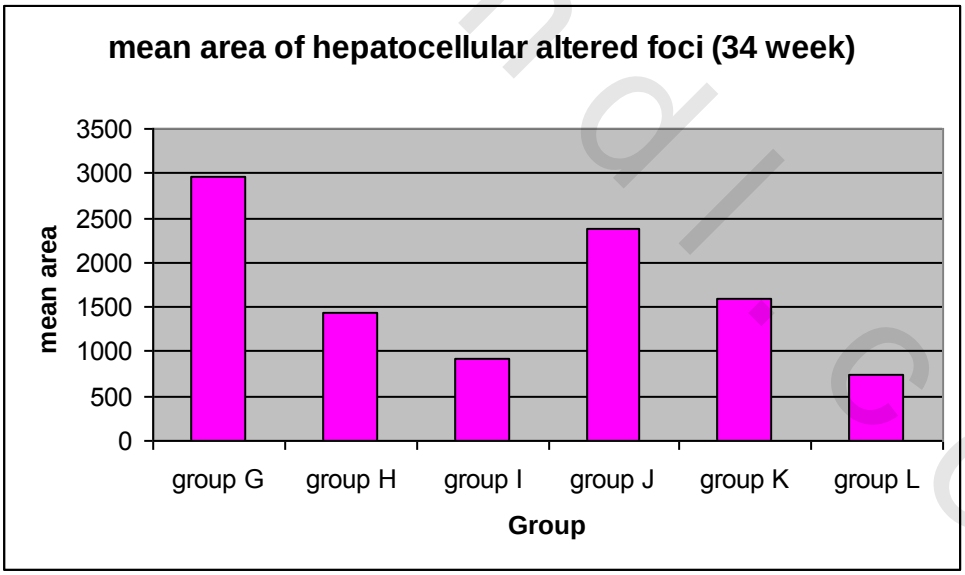

Chart 2: showing the mean area of altered hepatocellular foci in different groups at 34th week

B. At 38th week

The rats in groups A, B, C and D exhibited a normal hepatic architecture with no histopathological alterations

Group E

Livers of rat treated with cisplatin only (38th week) revealed the presence of focal areas of necrosis associated with inflammatory cell infiltration, sinusoidal dilatation and kupffer cell activation (**Fig. 34).** Moreover, there was also mononuclear inflammatory cells infiltration and congestion of portal blood vessels in the portal area (**Fig. 35).**

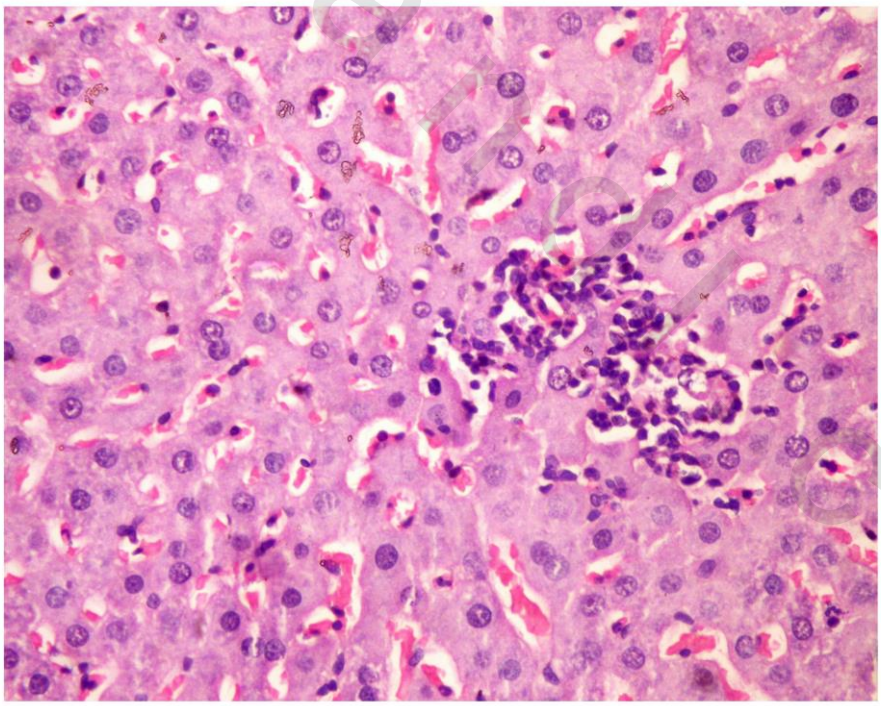

Fig. (34). Liver of rat treated with cisplatin (38th week) showing focal area of necrosis associated with inflammatory cell infiltration, sinusoidal dilatation and kupffer cell activation (H and E stain X 400).

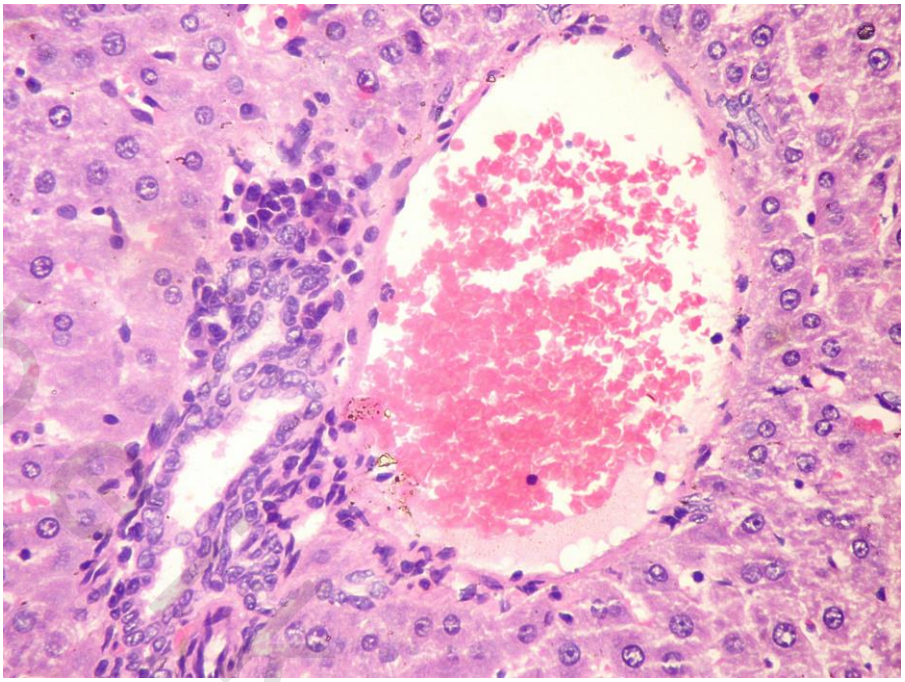

Fig. (35). Liver of rat treated with cisplatin (38th week) showing mononuclear inflammatory cells infiltration and congestion of portal blood vessels in the portal area (H and E stain X 400).

Group F

At 38th week, livers of rats treated with cisplatin and camel milk revealed decrease of congestion, few lymphocytic cells infiltration and mild biliary hyperplasia in major portal areas (**Fig. 36).**

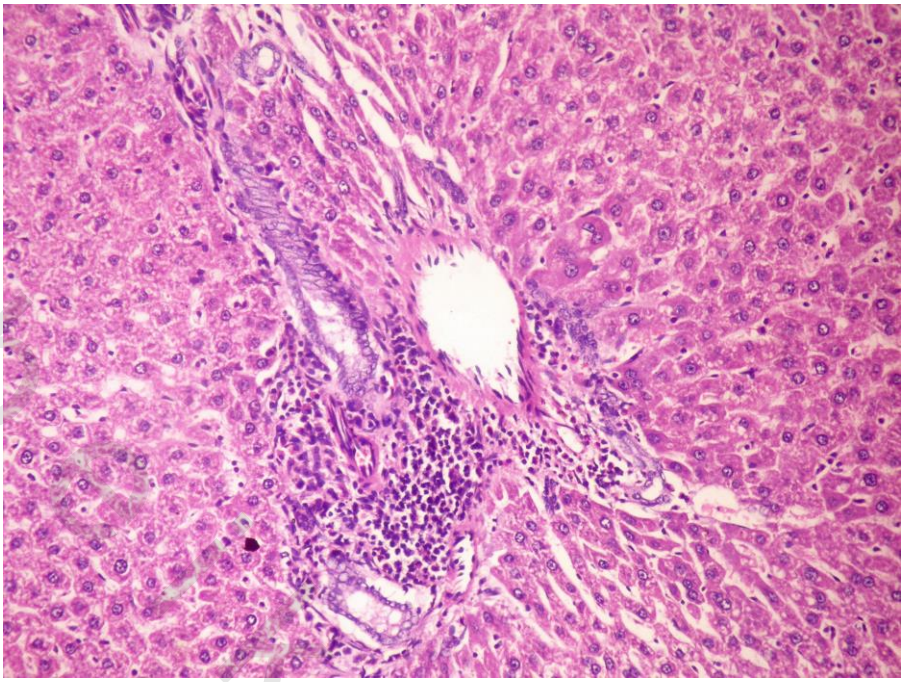

Fig. (36). Liver of rat treated with cisplatin and camel milk (38th week) showing lymphocytic cell infiltration of the portal area (H and E stain X 200).

Group G

Histopathological examination of livers of rats injected with DENA (38th week) revealed different types of hepatocellular altered foci including basophilic foci which was composed of small cells with cytoplasmic basophilia (**Fig. 37).** The altered hepatic foci increased in number and size compared to those observed in at 34th week. The number of mitotic figures in these altered hepatocellular foci considerably increased (**Table. 15)**. This group recorded the highest mean area for the foci **Chart (3).** Hepatocellular adenoma (**Fig. 38)** and hepatocellular carcinoma of glandular pattern in which small hepatocytes with little cellular atypia and severe structural atypia forming acinar like structures were seen in some areas (**Fig. 39)**. Severe Biliary hyperplasia and mild cholangiofibrosis in the major portal areas were also evident in all examined sections of this group.

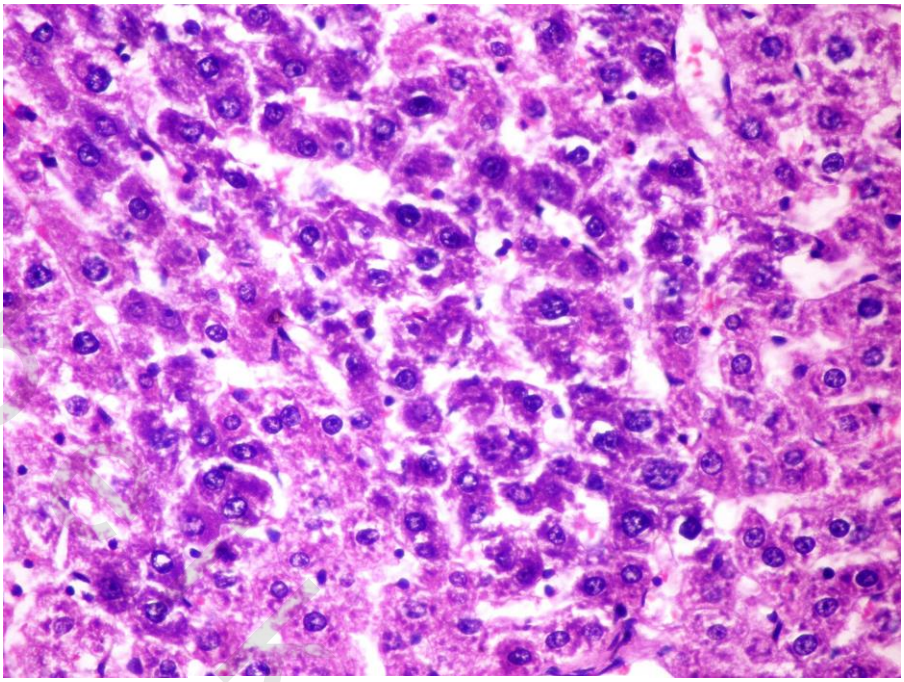

Fig. (37). Liver of rat injected with DENA (38th week) showing basophilic focus of hepatocellular alteration (H and E stain X 400).

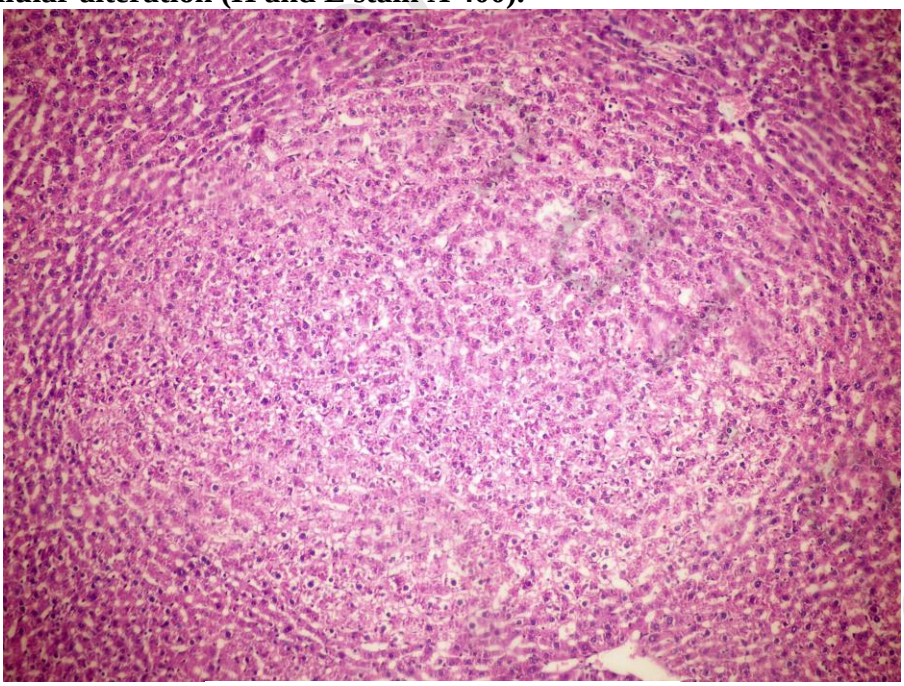

Fig. (38). Liver of rat injected with DENA (38th week) showing solid pattern of hepatocellular adenoma with compression of adjacent parenchyma (H and E stain X 100).

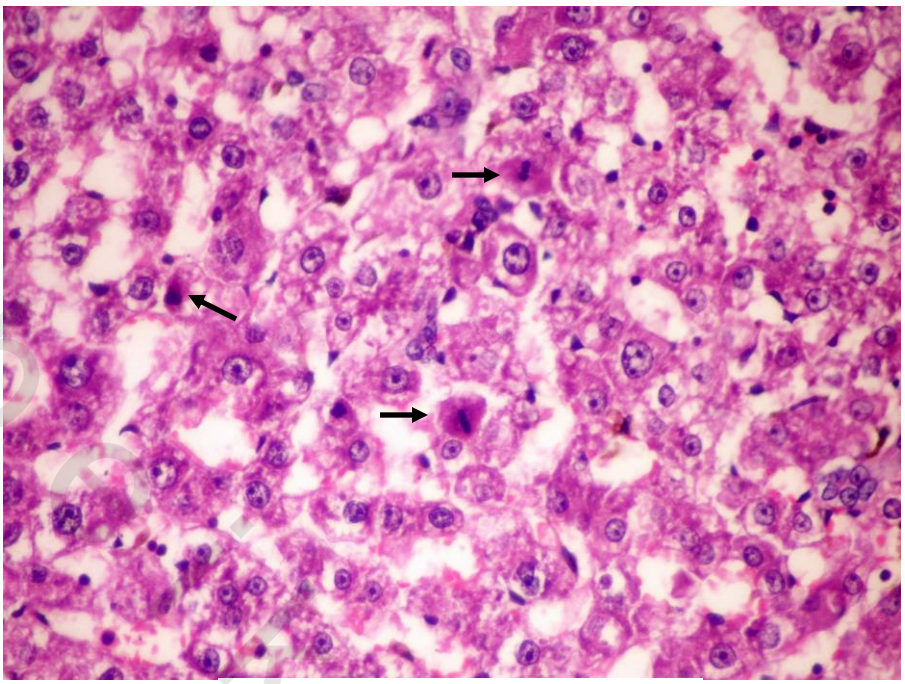

Fig. (39): Liver of rat injected with DENA (38th week) showing hepatocellular carcinoma with glandular pattern resembling bile ductules. Notice different mitotic figures (arrows) (H and E stain X 400).

Group H

Liver of rats injected with DENA and treated with camel milk (38th week) showed improvement in histopathological picture appeared in the form of decrease in size and number of hepatocellular altered foci. No basophilic foci were detected. Few mitotic figures at the edges of eosinophilic foci were demonstrated (**Table. 15).** The mean area of these altered hepatocellular foci considerably decreased in this group compared to the control group (**Chart 3)**. Decreases in the cellular density of eosinophilic foci with the appearance of regenerated binucleated cells were also evident (**Fig. 40).** In one case, eosinophilic hepatocellular adenoma was detected. Few inflammatory cells infiltration, few sporadic necrotic cells and apoptotic bodies were observed (**Fig. 41).** Moreover, focal areas of hepatocyte dissociation in which there was an increase in number of hepatocytes leading to distortion of hepatic cords were seen (**Fig. 42).**

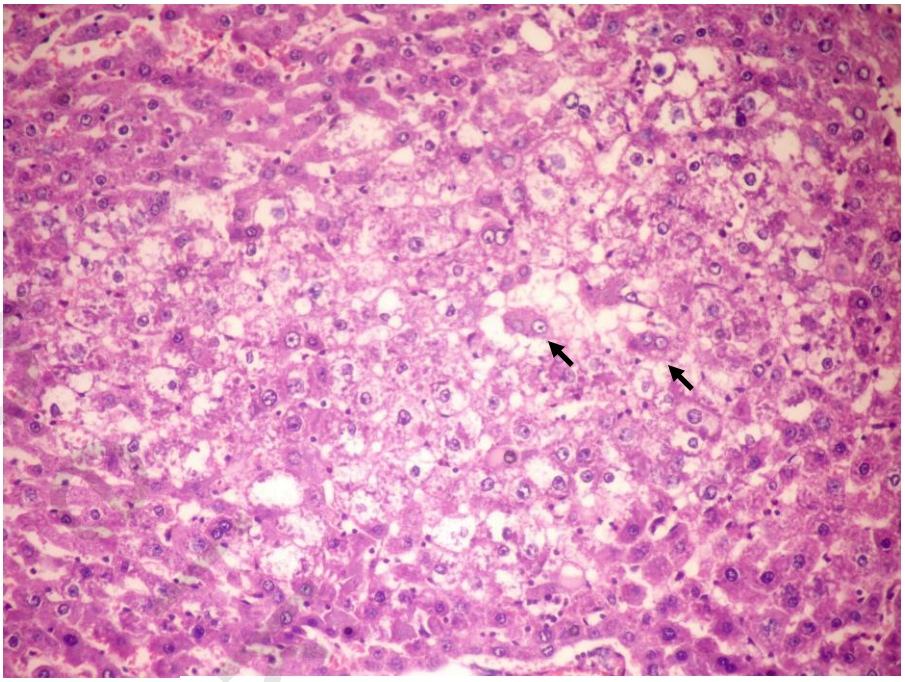

Fig. (40). Liver of rat injected with DENA and treated with camel milk for 9 weeks (38th week) showing a decreased cellular density inside an eosinophilic foci with the appearance of regenerated binucleated cells (arrows) (H and E stain X 200).

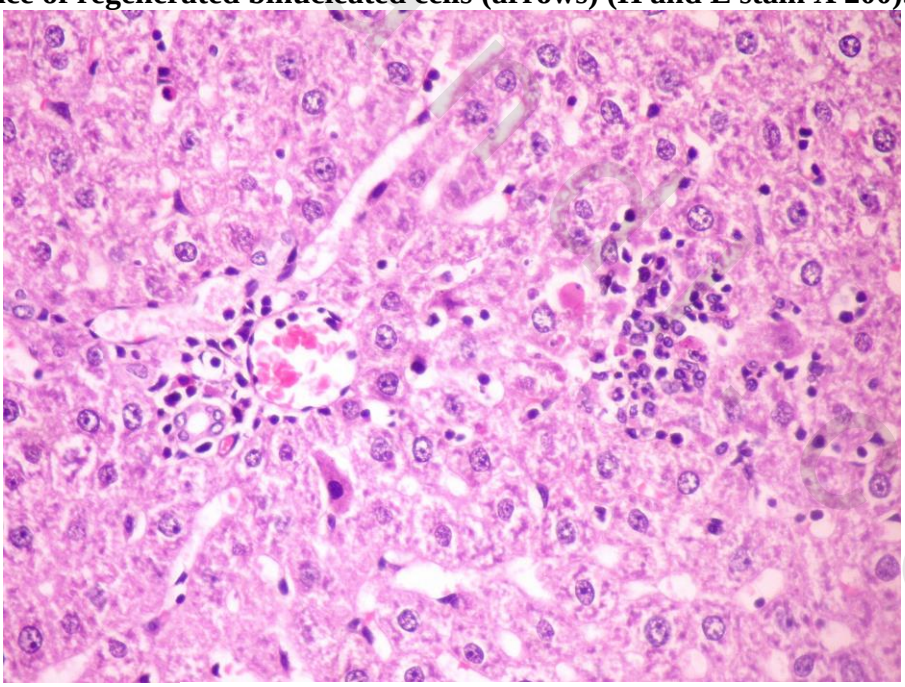

Fig. (41). Liver of rat injected with DENA and treated with camel milk for 9 weeks (38th week) showing apoptotic body and few inflammatory cells infiltration in portal area (H and E stain X 400).

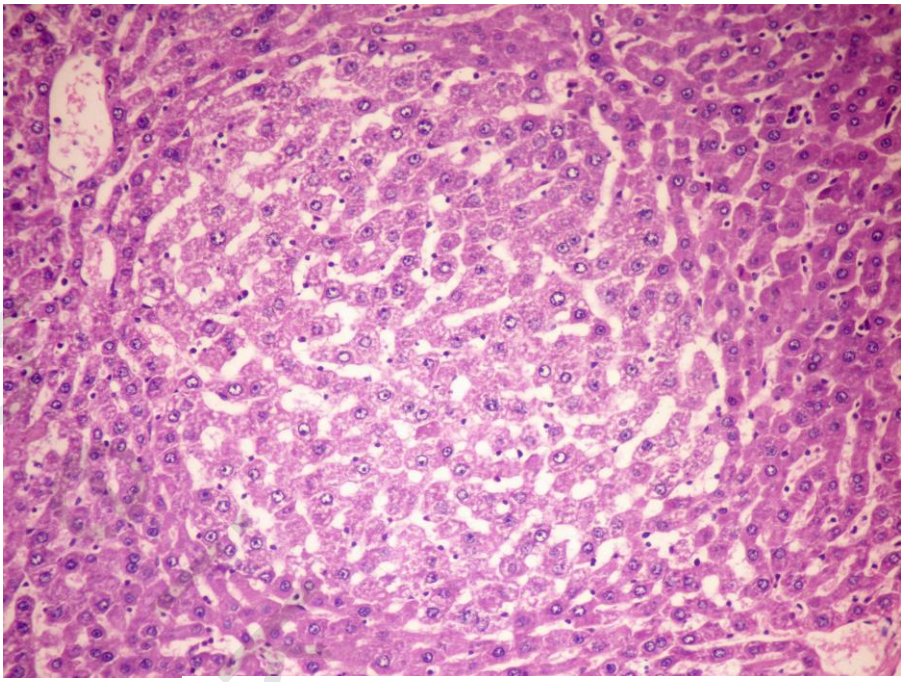

Fig. (42): Liver of rat injected with DENA and treated with camel milk for 9 weeks (38th week) showing focal area of hepatocellular dissociation. Notice the increase in the number of hepatocytes leading to distorsion of hepatic cords and resemblance of cells to normal hepatocytes (H and E stain X 200).

Group I

Livers of rats injected with DENA and treated with camel milk and turmeric extract for 9 weeks revealed the presence of altered hepatocellular foci. One hepatocellular adenoma was demonstrated (**Fig. 43)**. Mild inflammatory cells infiltration were evident in the portal area. The mean area of altered hepatocellular foci was lower compared to the previous group treated with camel milk alone (group H) and the control positive group (group G) (**Chart 3).**

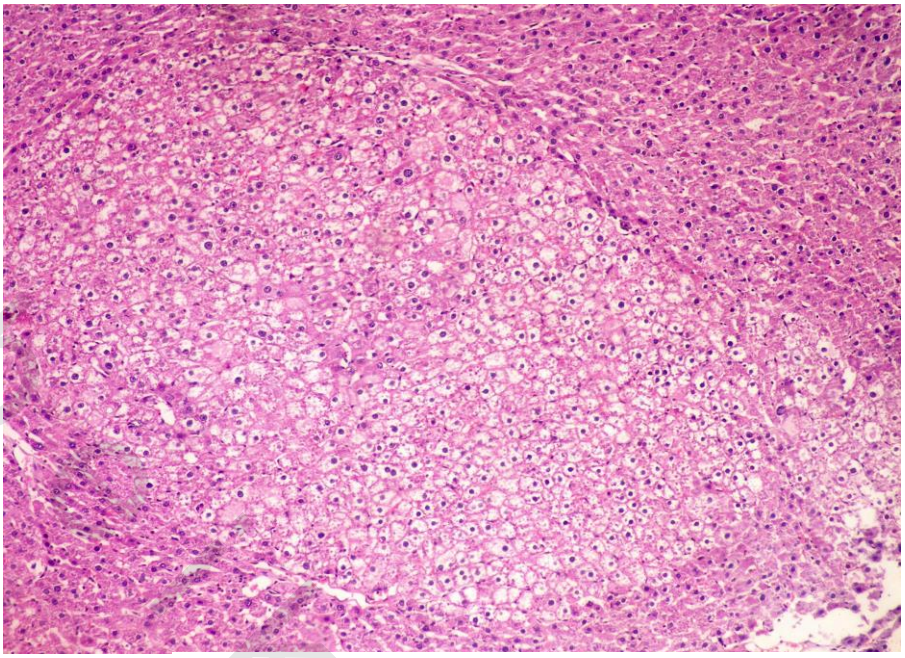

Fig. (43). Liver of rat injected with DENA and treated with camel milk and turmeric extract for 9 weeks (38th week) showing clear cell hepatocellular adenoma with compression of the surrounding normal parenchyma (H and E stain X 100).

Group J

Histopathological examination of livers of rats injected with DENA and treated with turmeric extract for 9 weeks (38th week) revealed presence of hepatocellular altered foci including basophilic foci (**Fig. 44).** Although the mean area of altered hepatocellular foci decreased in this group compared to the control group, it is still higher than that recorded in the groups treated with camel milk alone and camel milk with turmeric extract (**Chart 3).** Hepatocellular adenoma and large hepatocellular carcinoma with trabecular pattern were demonstrated (**Fig. 45).** Hepatocellular carcinoma was identified by the presence of more than 2-3 cell thick hepatocellular plated/cords, nuclear atypia, enlarged nuclei with prominent nucleoli, absence of potal tracts and frequent mitosis **(Fig. 46).** Intracellular hyaline bodies were demonstrated in hepatocellular carcinoma. Multilocular biliary cyst lined with flattened epithelium associated with fibrous connective tissue

proliferation was evident. Spongiosis hepatis and peliosis hepatis were evident in the liver of this group.

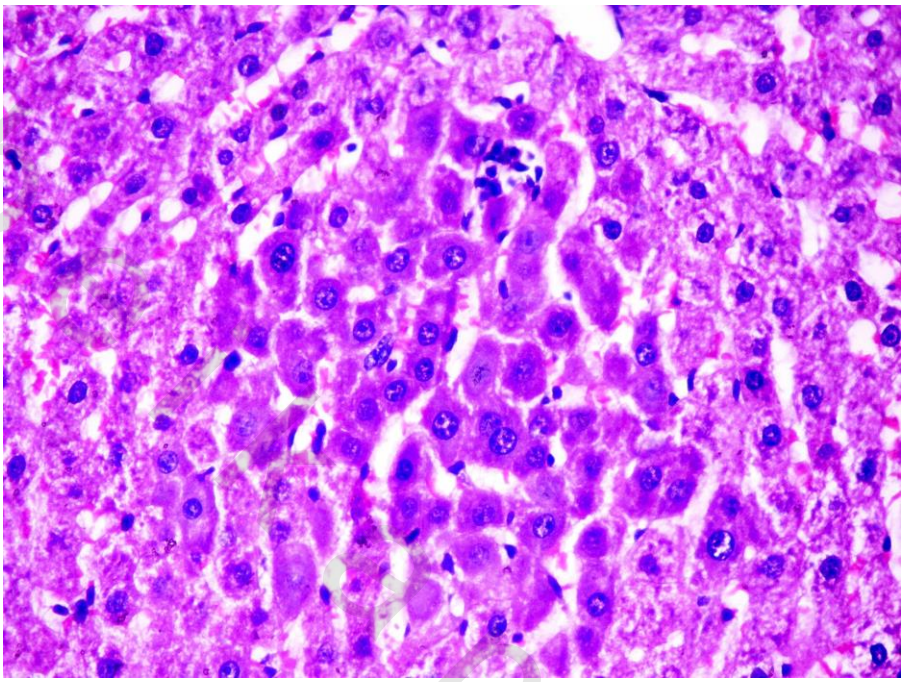

Fig. (44). Liver of rat injected with DENA and treated with turmeric extract for 9 weeks (38th week) showing basophilic focus of hepatocellular alteration (H and E stain X 400).

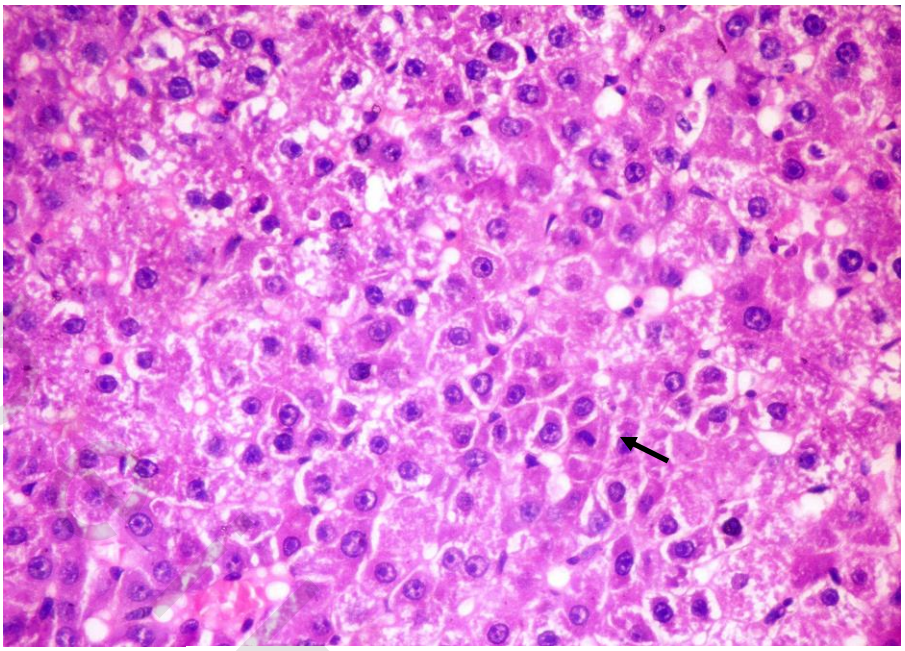

Fig. (45). Liver of rat injected with DENA and treated with turmeric extract for 9 weeks (38th week) showing hepatocellular carcinoma of trabecular pattern. Notice pleomorphism of hepatocytes and mitotic figure (arrow) (H and E stain X 400).

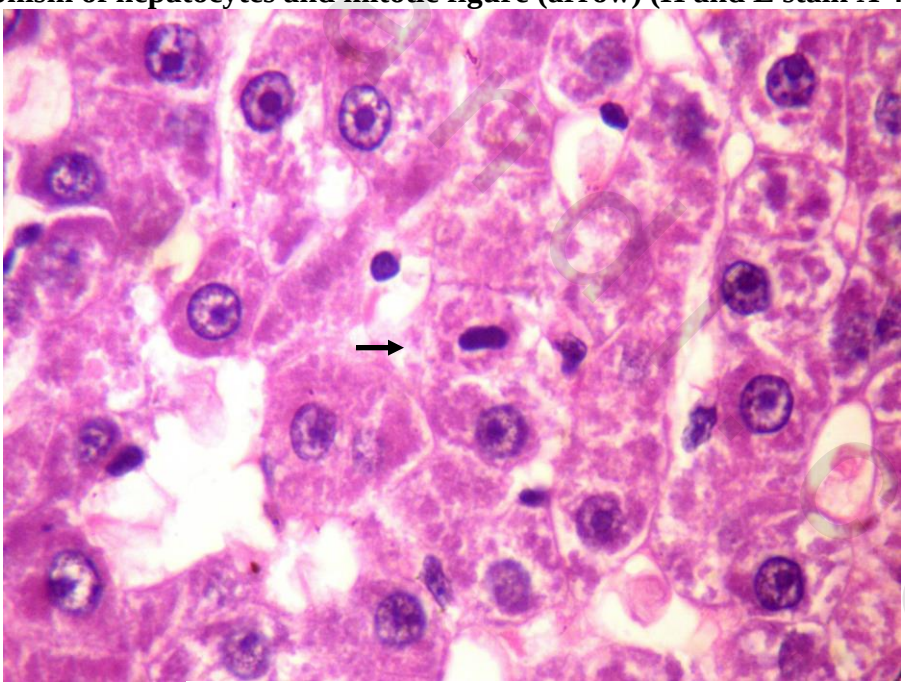

Fig. (46). Liver of rat injected with DENA and treated with turmeric extract for 9 weeks (38th week) showing hepatocellular carcinoma of trabecular pattern. Notice the mitotic figure (arrow) (H and E stain X 1000).

Group K

Histopathological examination of liver of rats injected with DENA and treated with cisplatin (38th week) showed hepatocellular altered foci including basophilic foci (**Fig. 47)**. Only a slight decrease in the mean area of hepatocellular altered foci was reported in this group compared to all other groups (**Chart 3).** Hepatocellular adenoma showing areas of necrosis, spongiosis hepatis and peliosis hepatis were demonstrated (**Fig. 48)**. Focus of microsteatosis, focal necrotic cells and inflammatory cells infiltration were evident. Moreover, severe biliary hyperplasia was seen in the major portal areas and multilocular biliary cysts were observed.

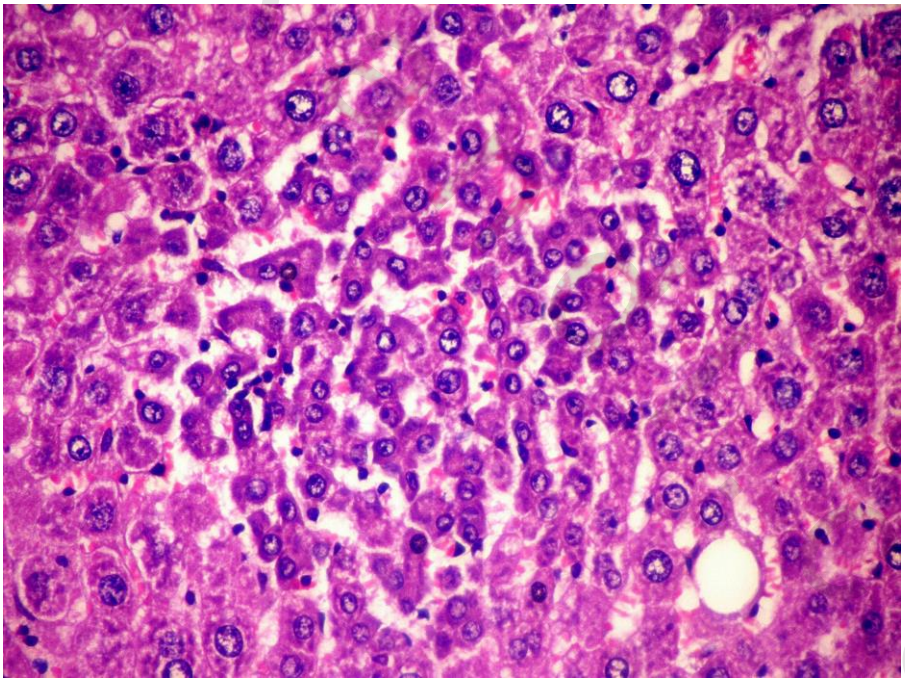

Fig. (47). Liver of rat injected with DENA and treated with cisplatin (38th week) showing basophilic focus of hepatocellular alteration comprised of small basophilic cells (H and E stain X 400).

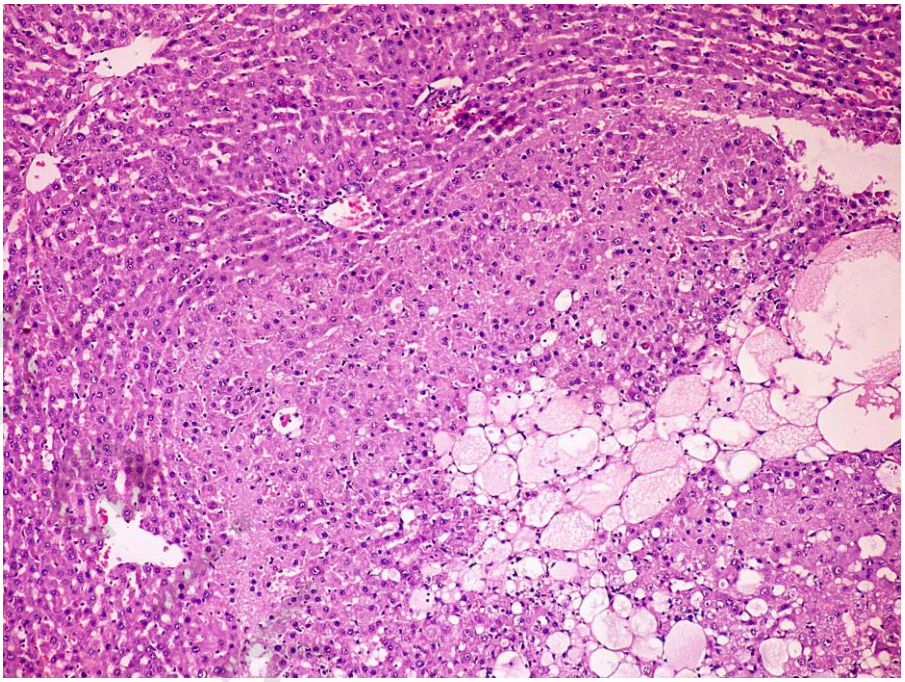

Fig. (48). Liver of rat injected with DENA and treated with cisplatin (38th week) showing hepatocellular adenoma with spongiosis hepatis (H and E stain X 100).

Group L

Histopathological examination of liver of rats injected with DENA and treated with cisplatin and camel milk (38th week) revealed the presence of few foci of hepatocellular alterations and focus of microsteatosis (**Fig. 49).** The mean area of hepatocellular altered foci in this group was lower than group G, J and K but higher than group H and I (**Chart 3).** Few sporadic necrotic cells and apoptotic bodies (**Fig. 50)** were demonstrated. Focal areas of hepatocellular dissociation and mild peliosis hepatis were present but less evident than the previous group.

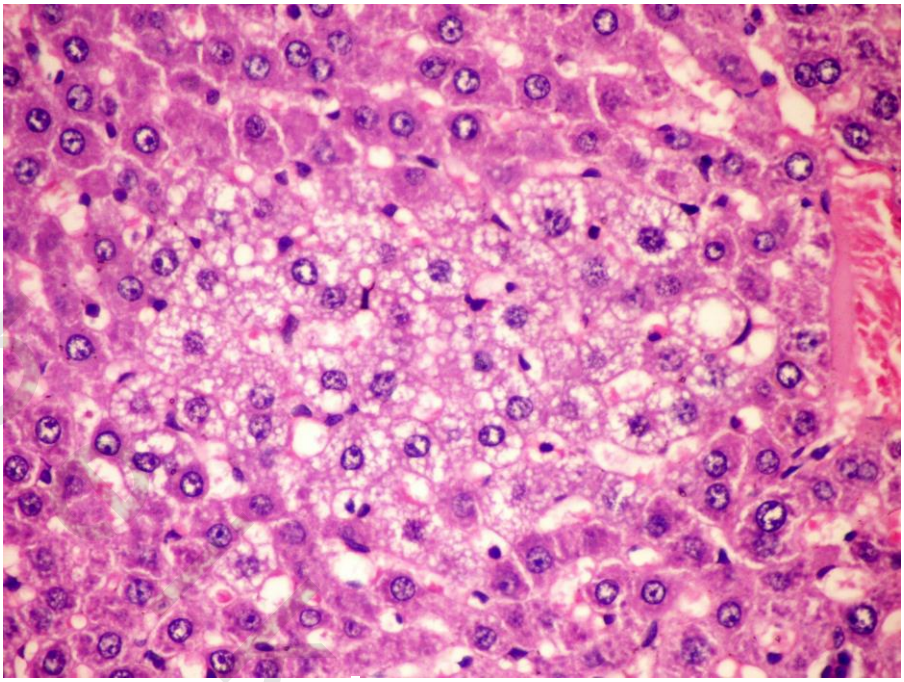

Fig. (49). Liver of rat injected with DENA and treated with cisplatin and camel milk (38th week) showing focus of microsteatosis (H and E stain X 400).

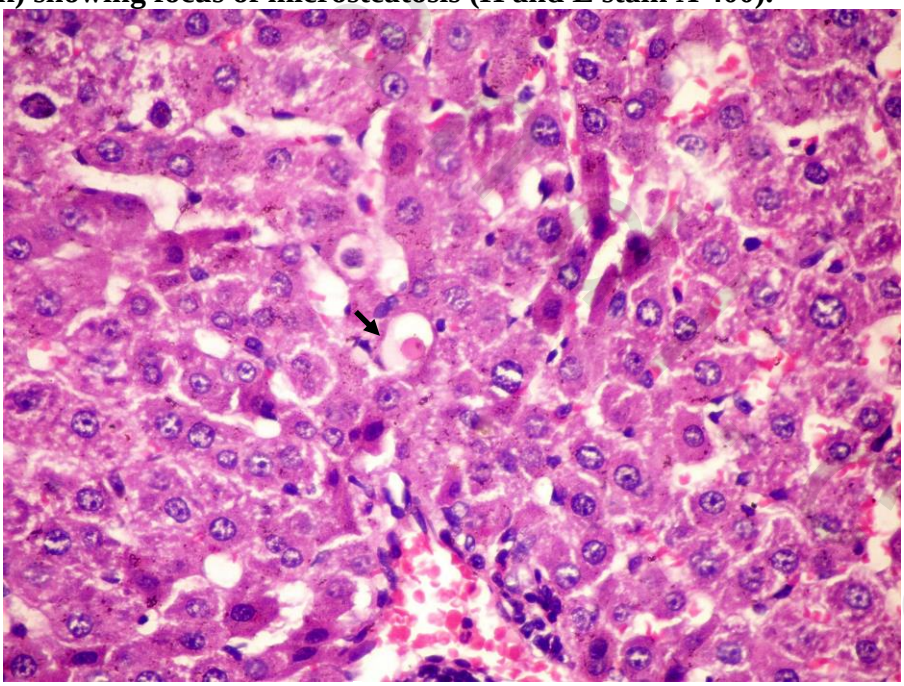

Fig. (50): Liver of rat injected with DENA and treated with cisplatin and camel milk (38th week) showing increase single cell necrosis and apoptosis (arrow) (H and E stain X 400).

Lesion score of hepatocellular altered foci at 38th week

The number and size of clear cell foci, eosinophilic foci and basophilic foci as well as the number of mitotic figures were remarkably decreased in group L injected with DENA and treated with camel milk and cisplatin compared to group G treated with DENA only. Moreover the hepatocellular adenoma and hepatocellular carcinoma were absent in this group. On the other hand, Group H, I and K revealed low number of mitotic figures and no hepatocellular carcinoma compared to the control positive group.

Table (15): showing the lesion score of liver histopathology at 38th week

GP	CF	EF	BF	HCA	HCC	SIZE	MF
G	6.66±2.02	8.66±2.9	1.66±0.88	0.33±0.33	0.33±0.33	1.66±0.88	4.00±3.05
H	13.5±5.03	10.00±3.8	1.5±0.86	0.25±0.25	000±000	1.5±0.5	1.5±0.64
I	12.00±5.00	8.5±3.5	2.00±000	0.5±0.5	000±000	1.00±1.00	2.00±1.00
J	14.66±3.7	8.00±0.57	0.66±0.33	0.33±0.33	0.33±0.33	2.00±000	3.33±0.17
K	1.25±0.62	9.75±1.65	4.75±3.09	0.5±0.28	000±000	2.00±0.4	1.25±0.94
L	1.75±0.75	4.7±3.1	0.75±0.25	000±000	000±000	1.00±0.57	0.25±0.25

CF: clear cell foci, EF: eosinophilic cell foci. BF: basophilic foci. HCA: hepatocellular adenoma. HCC: hepatocellular carcinoma. MF: mitotic figure.

The mean area of altered hepatocellular foci in different group at 38th week

The values of altered heptocellular foci at 38 week were changed completely than at 34th week. Group G (the positive control) recorded higher level than that recorded at 34th week. However, the lowest level was recorded in group H and I even their values was lower than that recorded at 34th week. The highest level among treated groups was recorded in group K (treated with cisplatin only) and which was higher than that recorded at 34th week

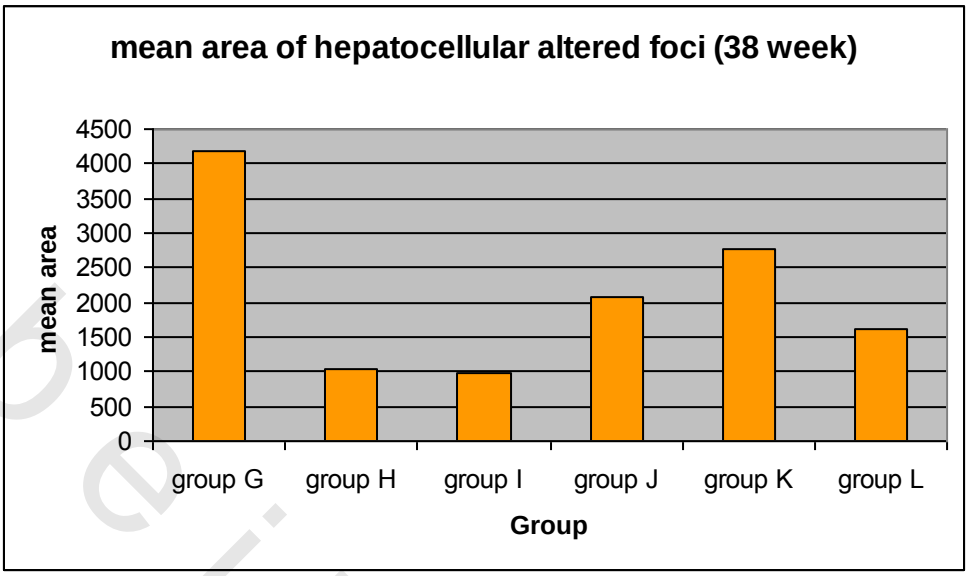

Chart (3): showing the mean area of altered hepatocellular foci in different groups at 38th week

4.8. Immunohistochemical staining of P-glutathione-s-transferase

Multiple foci of brown positive reaction in hepatic tissue representing enzyme altered foci have been demonstrated in all groups injected with DENA at 34th week and 38th week post injection. On the other hand, the control group showed negative staining for P-GST (**Fig. 51)**. Remarkably, there was a variation in size and number of these enzyme altered foci between the different groups.

Large strongly positive enzyme altered foci was detected at 34th week in group G injected with DENA **(Fig. 52, 53).** Otherwise, group H, I and group L showed small and moderate sized foci of positively stained enzyme altered foci **(Fig. 54, 55).** Group J and K revealed the presence of large sized enzyme altered foci which is almost comparable to group G **(Fig. 56).** This variation was clearer at 38th week post injection of DENA than at 34th week post injection **(Fig. 57- 61).** The mean of area percent of enzyme altered foci in different groups at 34th and 38th week post injection of DENA which was

measured by image analysis is demonstrated in **chart 4**. Group L at 38th week recorded the lowest mean area percent of enzyme altered foci followed by group I and H respectively.

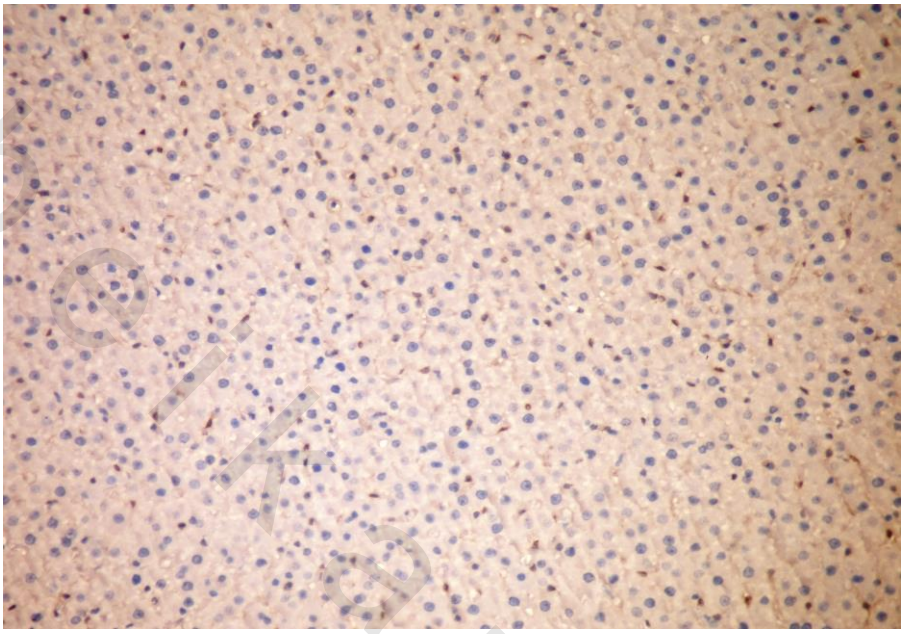

Fig. (51). Liver of rat of control negative group (34th week) showing negative reaction for immunohistochemical staining of P-GST (IP X 200).

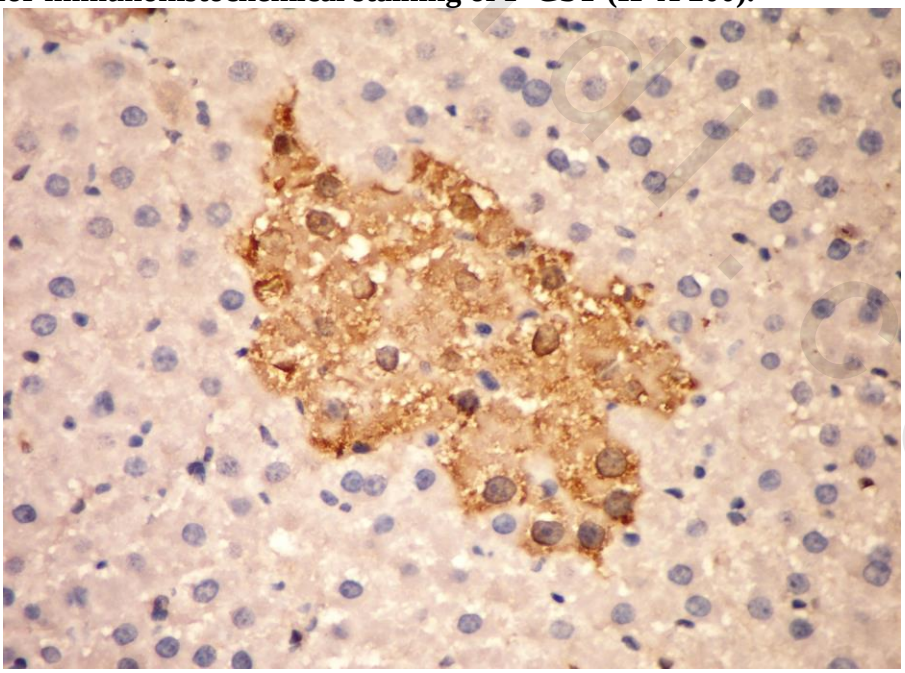

Fig. (52). Liver of rat injected with DENA (34th week) showing focal area of brown positive reaction for immunohistochemical staining of P-GST (IP X 400)

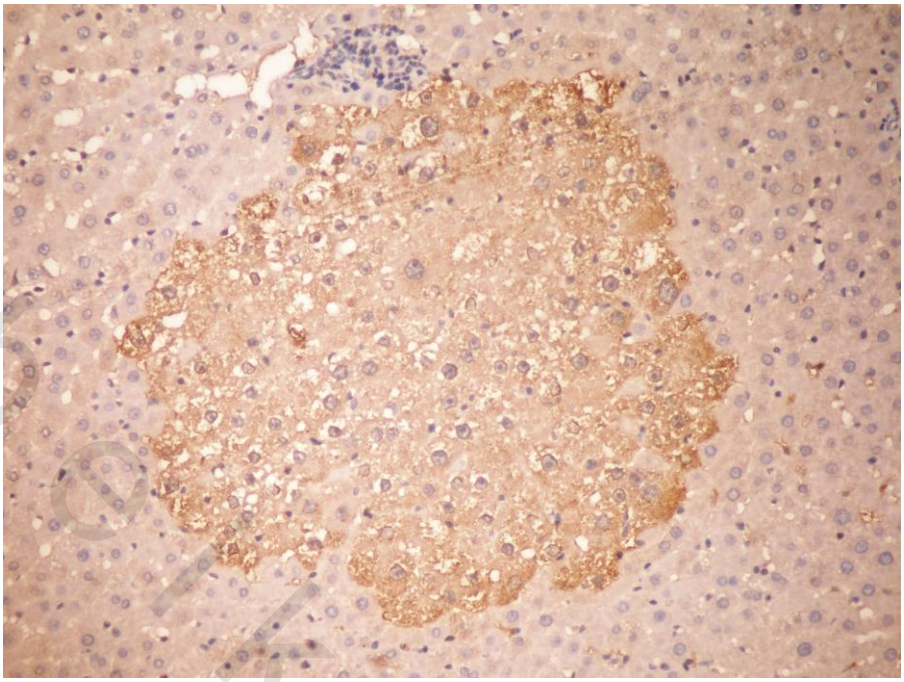

Fig. (53). Liver of rat injected with DENA (34th week) showing focus of brown positive reaction for immunohistochemical staining of P-GST (IP X 200)

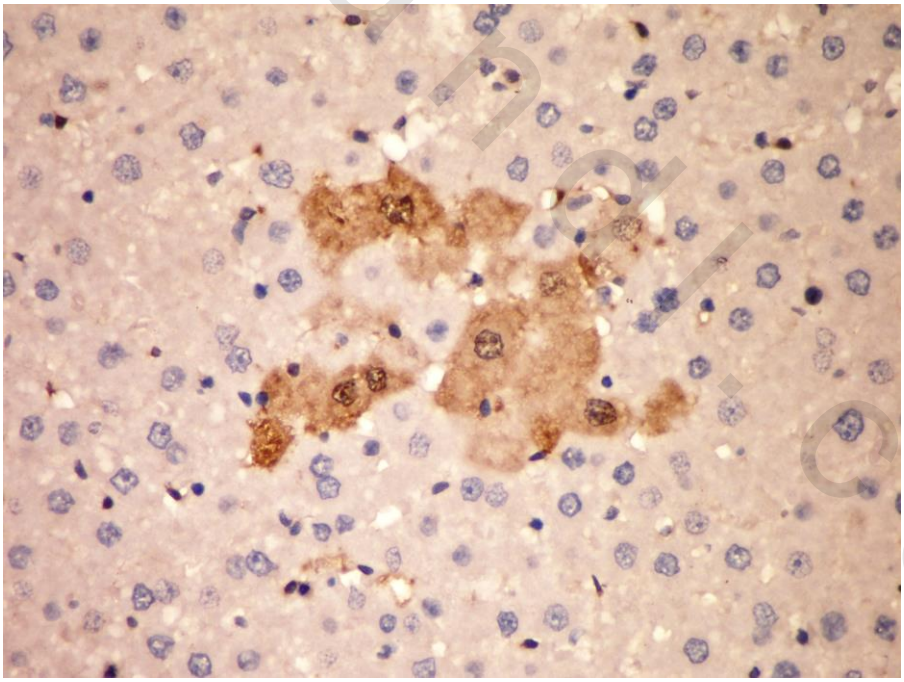

Fig. (54). Liver of rat injected with DENA and treated with camel milk (34th week) showing minute focus of brown positive reaction for immunohistochemical staining of P-GST (IP X 400).

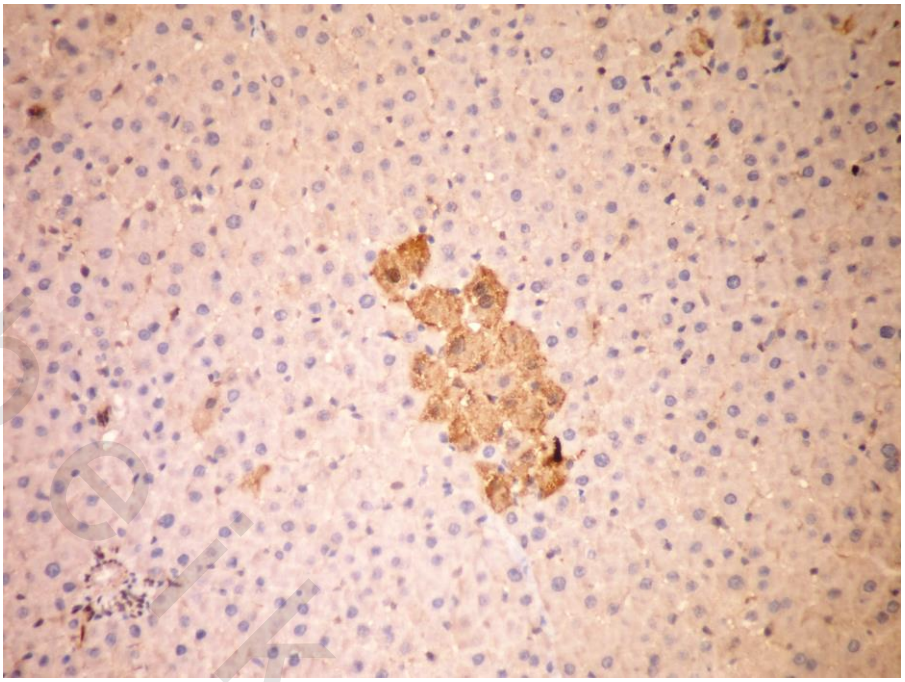

Fig. (55). Liver of rat injected with DENA and treated with turmeric extract and camel milk (34th week) showing focus of brown positive reaction for immunohistochemical staining of P-GST (IP X 200).

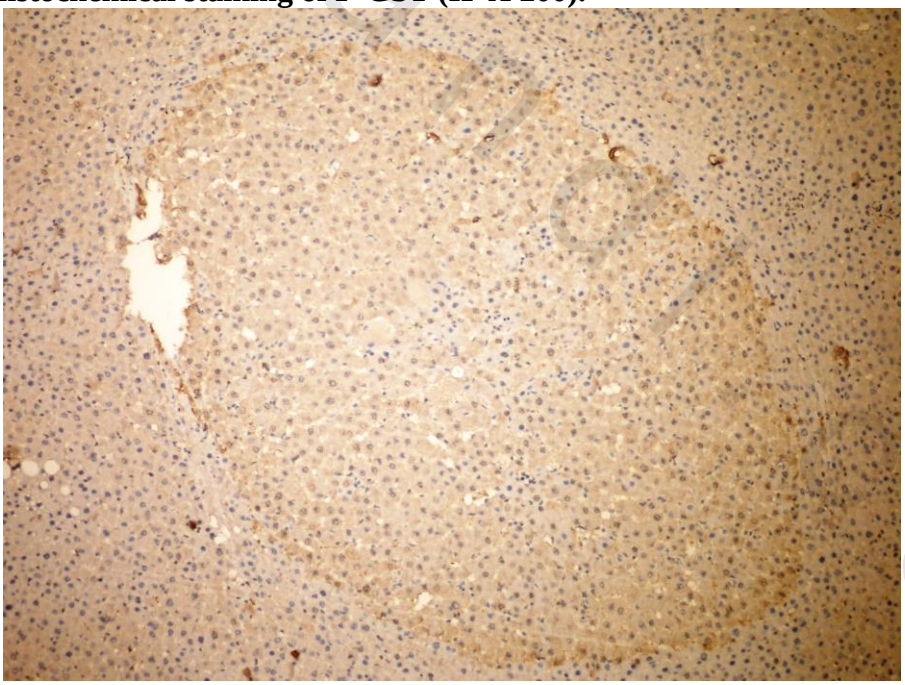

Fig. (56). Liver of rat injected with DENA and treated with cisplatin (34th week) showing large focus of brown positive reaction for immunohistochemical staining of P-GST (IP X 100).

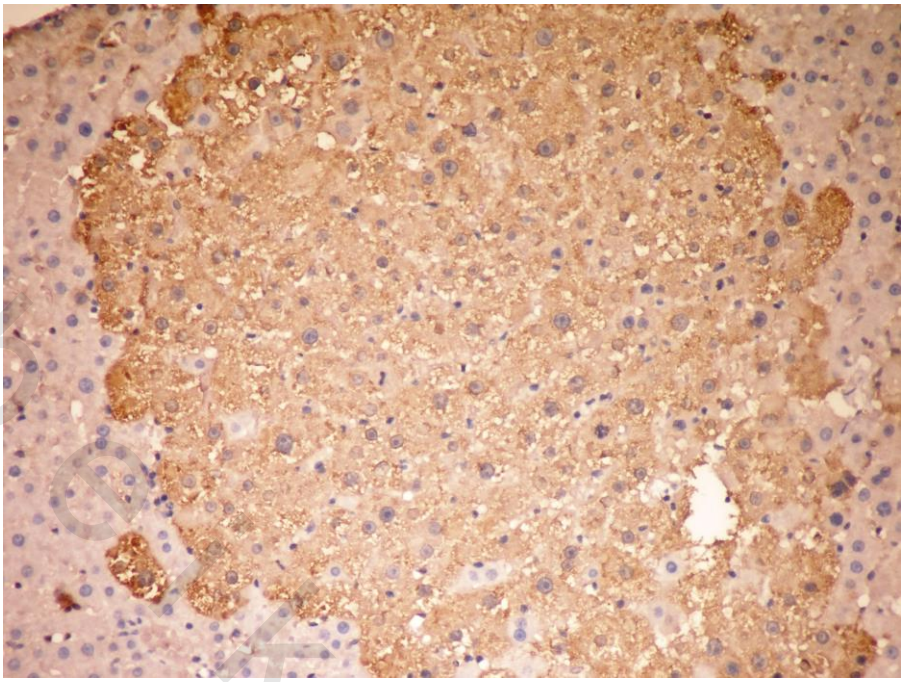

Fig. (57). Liver of rat injected with DENA (38th week) showing large focus of brown positive reaction for immunohistochemical staining of P-GST (IP X 200).

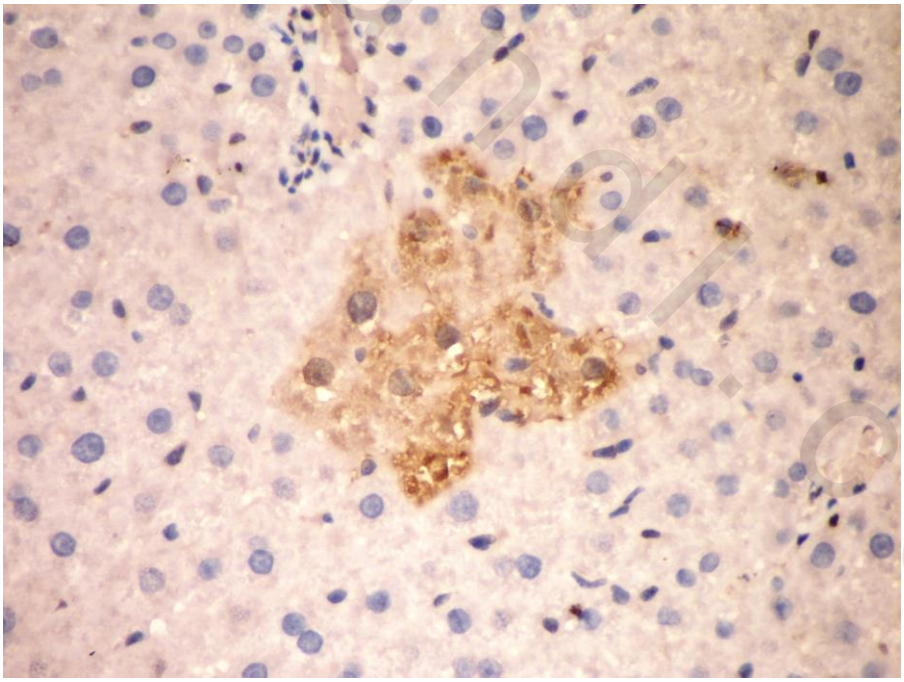

Fig. (58). Liver of rat injected with DENA and treated with camel milk and turmeric extract (38th week) showing small focus of brown positive reaction for immunohistochemical staining of P-GST (IP X 400).

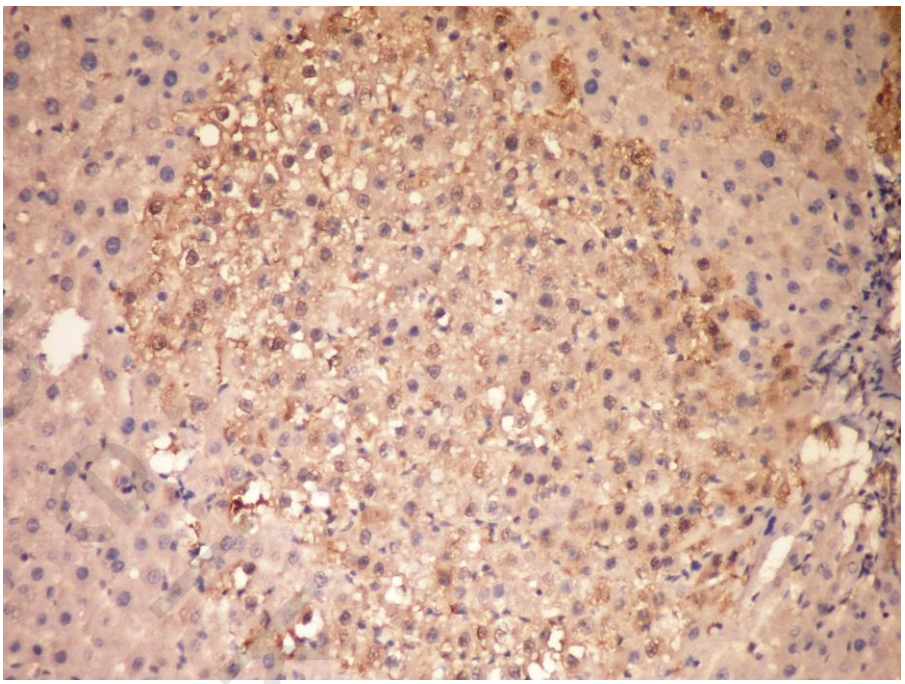

Fig. (59). Liver of rat injected with DENA and treated with turmeric extract (38th week) showing focus of brown positive reaction for immunohistochemical staining of P-GST (IP X 200).

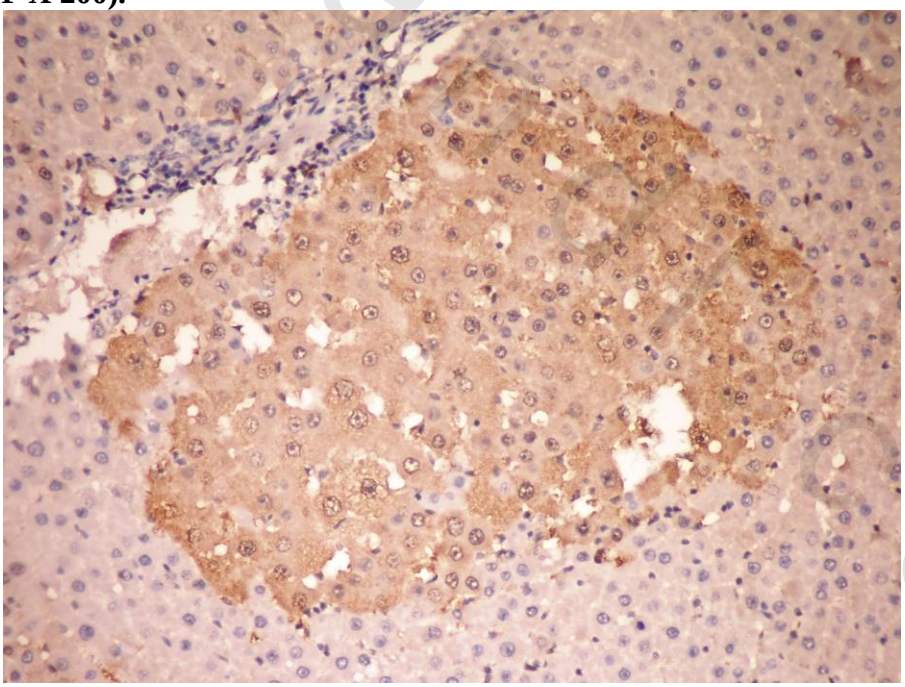

Fig. (60). Liver of rat injected with DENA and treated with cisplatin (38th week) showing large focus of brown positive reaction for immunohistochemical staining of P-GST (IP X 200).

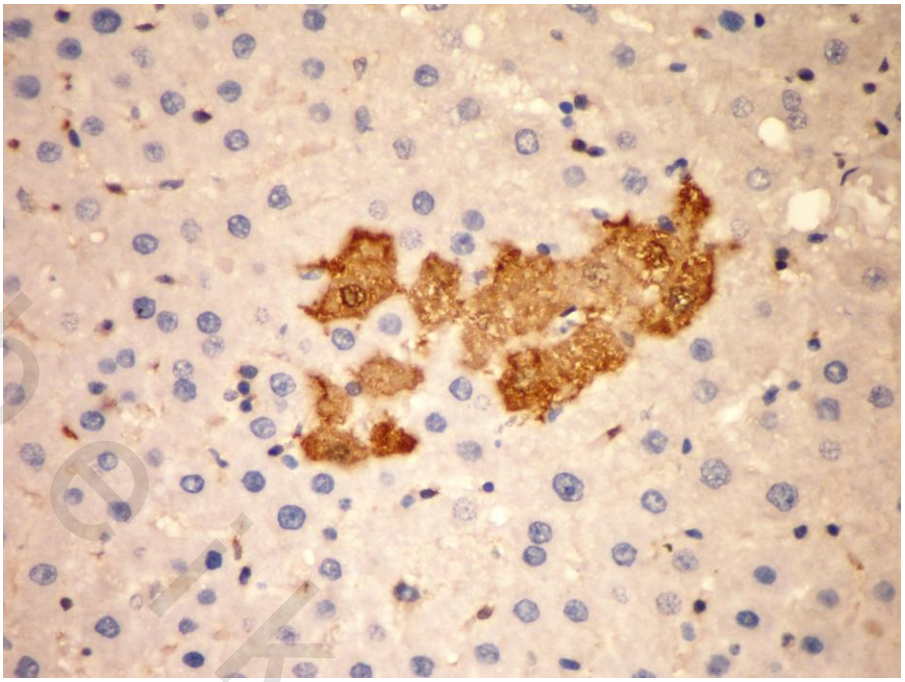

Fig. (61). Liver of rat injected with DENA and treated with cisplatin and camel milk (38th week) showing small focus of brown positive reaction for immunohistochemical staining of P-GST (IP X 400).

The mean area percent of enzyme altered foci in liver of different groups

At 38th week the area percent of group G recorded high value than at 34th week. However the lowest value was recorded in group L. The area of enzyme altered foci of group H and I at 34th and 38th week represented the best and stable values among the treated groups

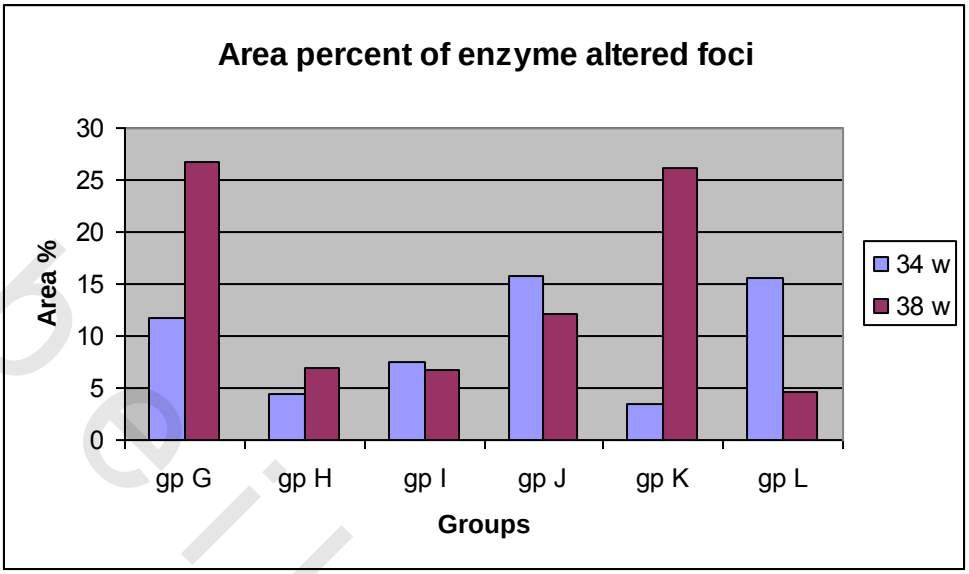

Chart (4): showing the mean area percent of enzyme altered foci in liver of different groups

4.9. Histopathological findings of Kidneys

Group 1

The kidneys of rats in control group expressed almost no histopathological alterations.

Group 2

Histopathological examination of kidneys of rat from group 2 at 19th and 28th week post injection revealed more or less similar pathological alterations. At 19 weeks, there was swelling of tubular epithelium and narrowing of tubular lumen. Protein casts in the lumen of medullary renal tubules were also seen **(Fig. 62).** At 28th week, slight atrophy of glomerular tuft with distension of Bowman's capsule, focal areas of tubular necrosis associated with mononuclear inflammatory cells infiltration **(Fig. 63)** were noticed in the medulla and peritubular interstitial mononuclear inflammatory cell infiltration **(Fig. 64).**

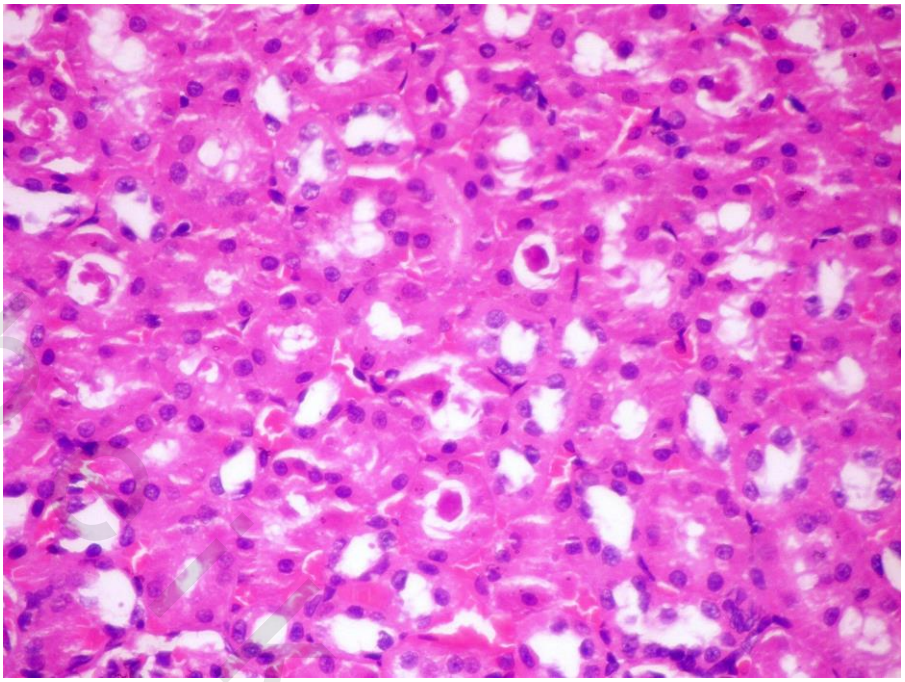

Fig. (62). Kidney of rat injected with DENA and administered phenobaritone (19th week) showing protein casts in the renal tubules of the medulla with cellular swelling of tubular epithelium and narrowing of tubular lumen (H and E stain X 400).

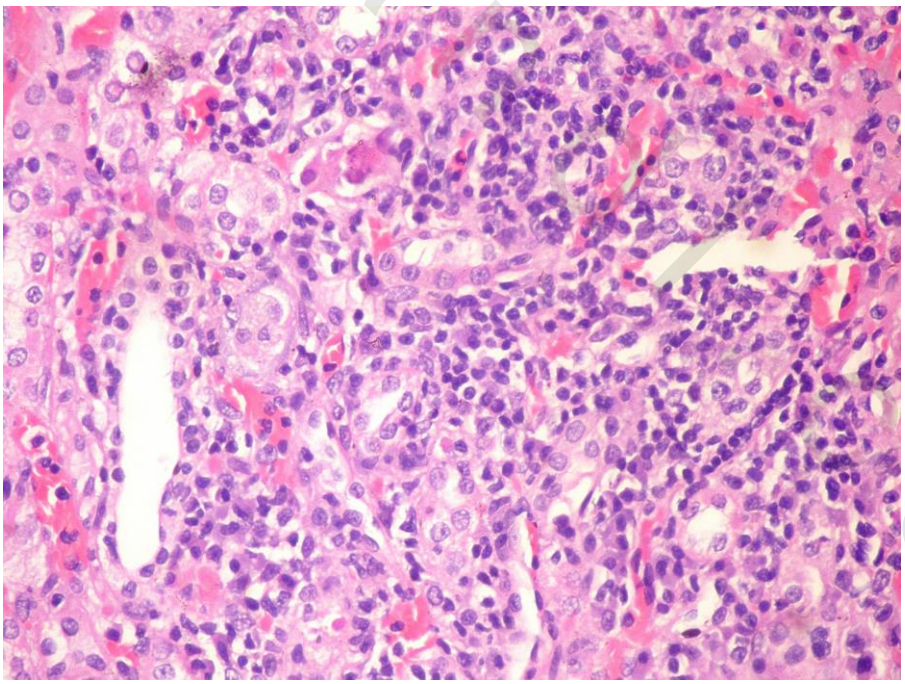

Fig. (63). Kidney of rat injected with DENA and administered phenobaritone (28th week) showing focal area of tubular necrosis in the medulla associated with mononuclear inflammatory cell infiltration mainly lymphocytes (H and E stain X 400).

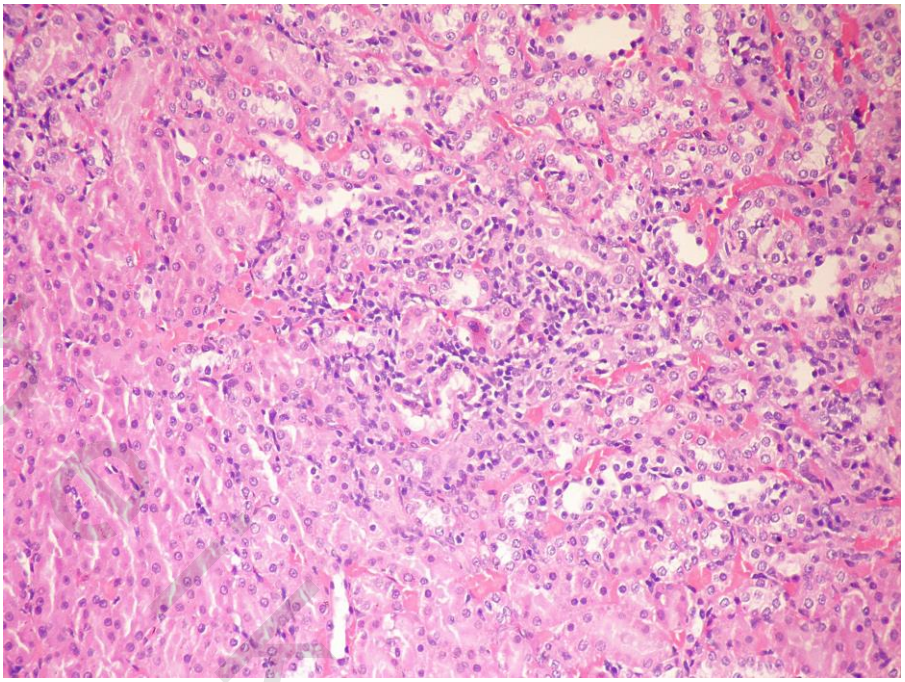

Fig. (64). Kidney of rat injected with DENA and administered phenobaritone (28th week) showing peritubular interstitial lymphocytic cell infiltration (H and E stain X 200).

A. At 34th week

Group A, B, C and D showed no histopathological findings

Group E

Histopathological examination of kidneys of rats treated with cisplatin (34th week) showed hypercellularity of capillary tuft with thickening of glomerular basement membrane which was confirmed by red coloration with PAS stain **(Fig. 65, 66).** There was also congestion of intertubular blood vessels, vacuolation of renal tubular epithelium and necrosis in renal medulla **(Fig. 67)**. There was also interstitial nephritis in which mononuclear inflammatory cells infiltration were noticed in the renal interstitial tissue **(Fig. 68)**. In addition karyomegaly of the nuclei of tubular lining epithelium and inflammatory cells infiltration of renal interstitial tissue were demonstrated **(Fig. 69)**. Moreover, chronic interstitial nephritis with

intertubular fibroblastic proliferation, cystic dilatation and mononuclear inflammatory cells infiltration was observed **(Fig. 70).** The perivascular, periglomerular and peritubular fibroblastic proliferation was confirmed by giving blue coloration with MTC stain **(Fig. 71, 72).**

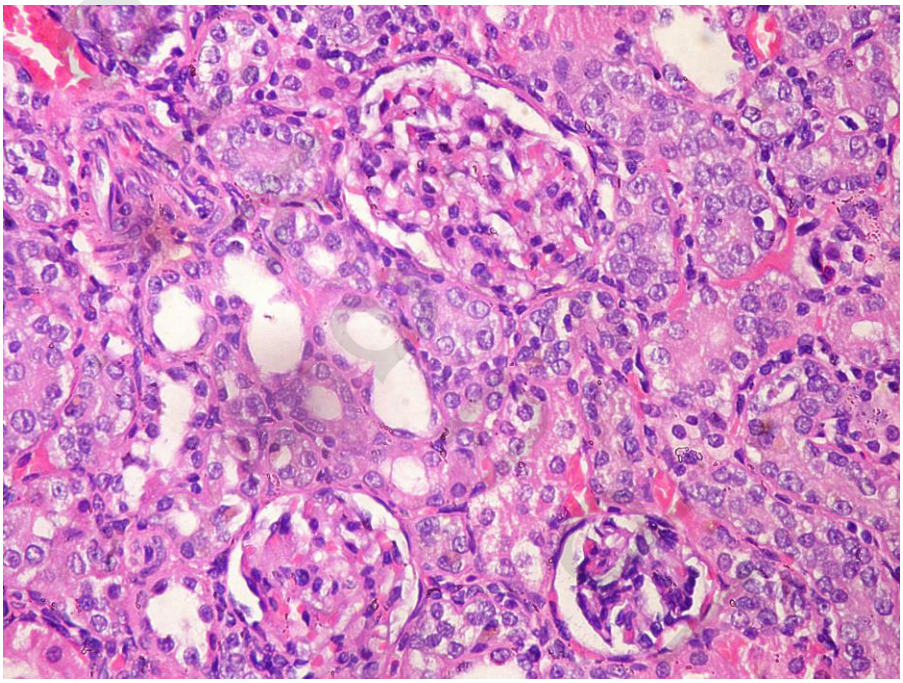

Fig. (65). Kidney of rat treated with cisplatin only (34th week) showing hypercellularity of capillary tuft with thickening of glomerular basement membrane (H and E stain X 400).

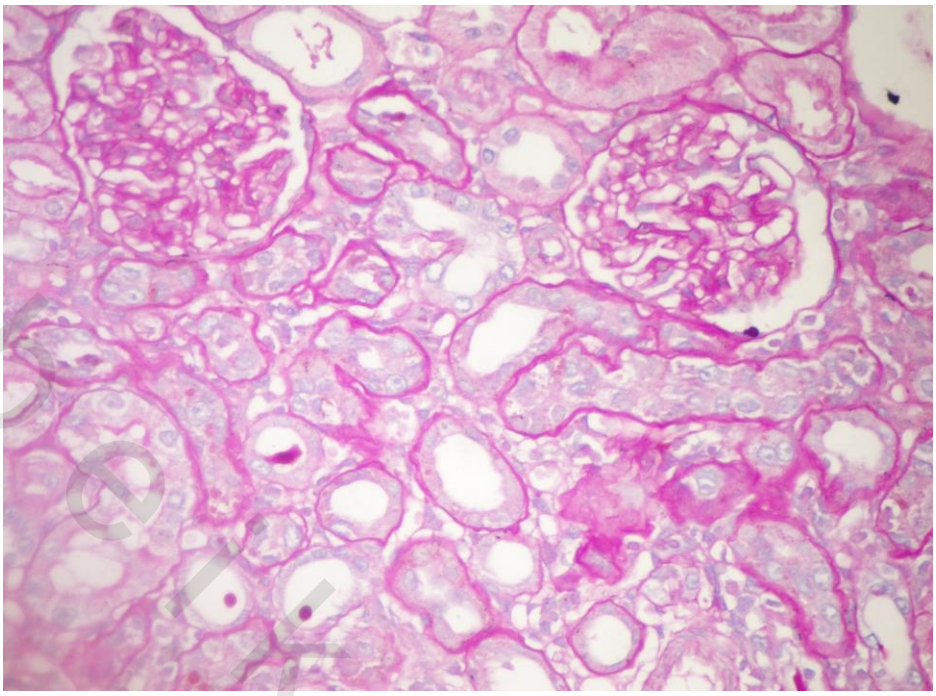

Fig. (66). Kidney of rat treated with cisplatin (34th week) showing thickened glomerular and tubular basement membrane (PAS stain X400).

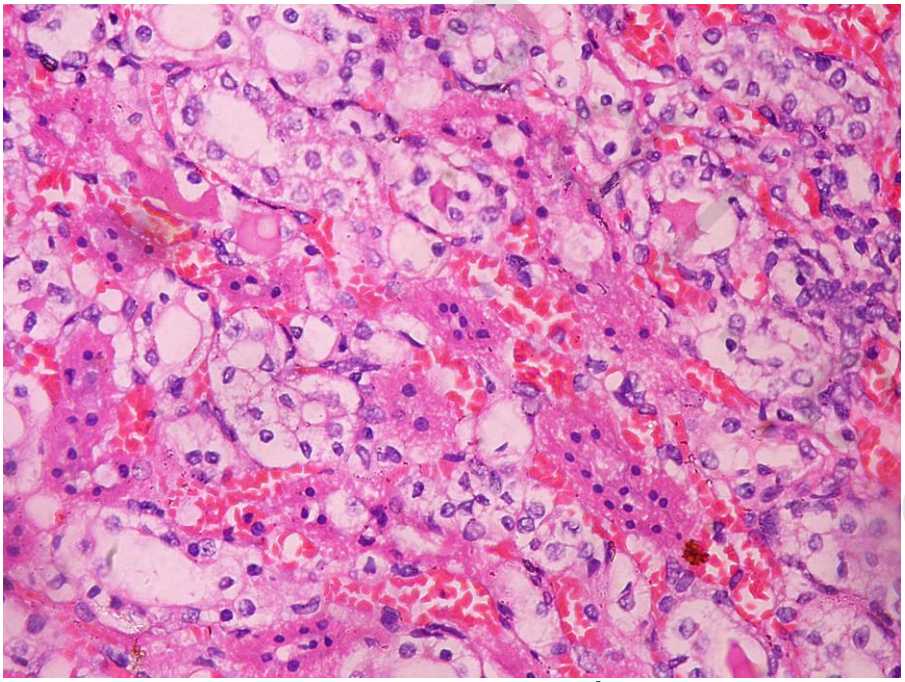

Fig. (67). Kidney of rat treated with cisplatin (34th week) showing congestion of intertubular blood vessels, vacuolation and necrosis of renal tubular epithelium in the renal medulla (H and E stain X 400).

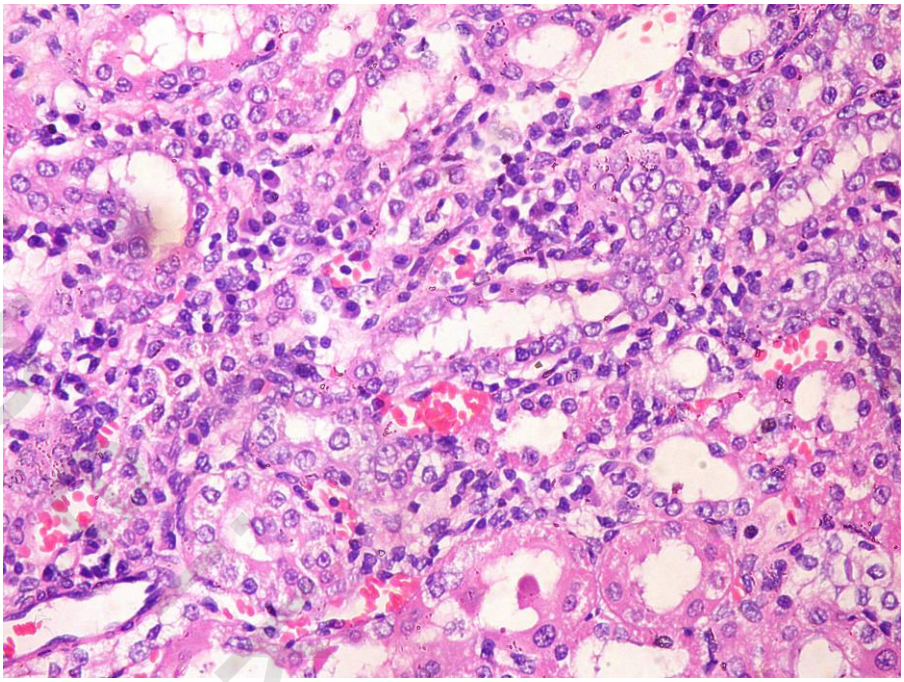

Fig. (68). Kidney of rat treated with cisplatin only (34th week) showing interstitial nephritis. Notice mononuclear inflammatory cell infiltration in the renal interstitial tissue (H and E stain X 400).

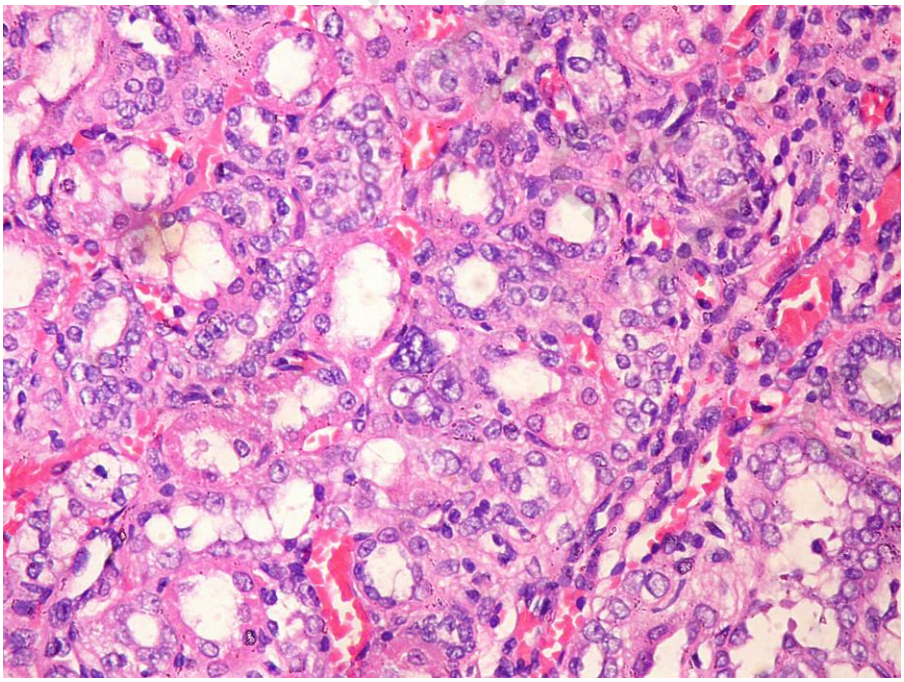

Fig. (69). Kidney of rat treated with cisplatin only (34th week) showing Karyomegaly of the nuclei of tubular lining epithelium (H and E stain X 400).

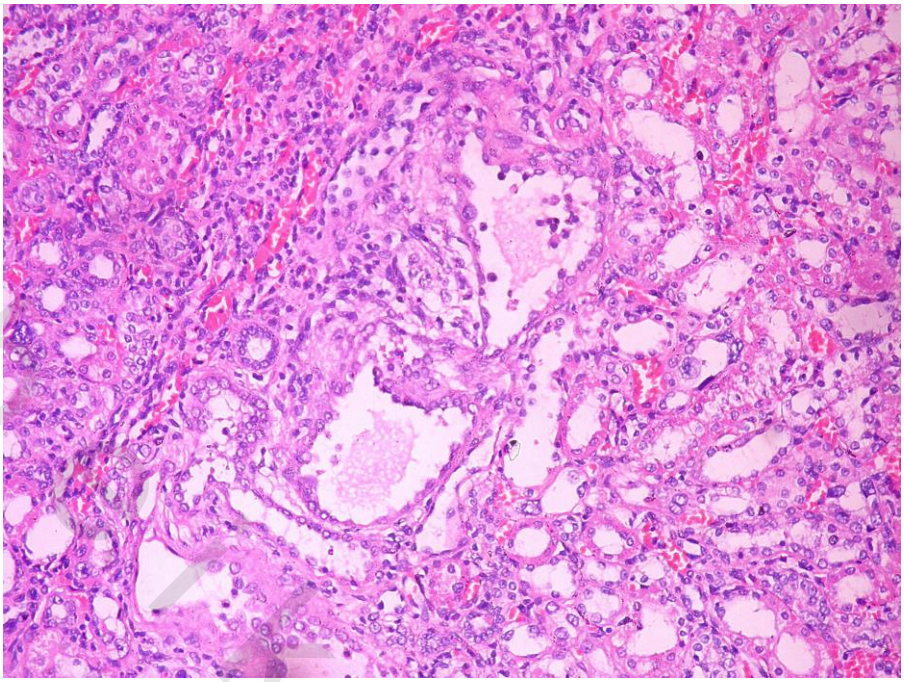

Fig. (70). Kidney of rat treated with cisplatin only (34th week) showing chronic interstitial nephritis. Notice cystic dilatation of renal tubules and interstitial fibroblasts proliferation (H and E stain X 200).

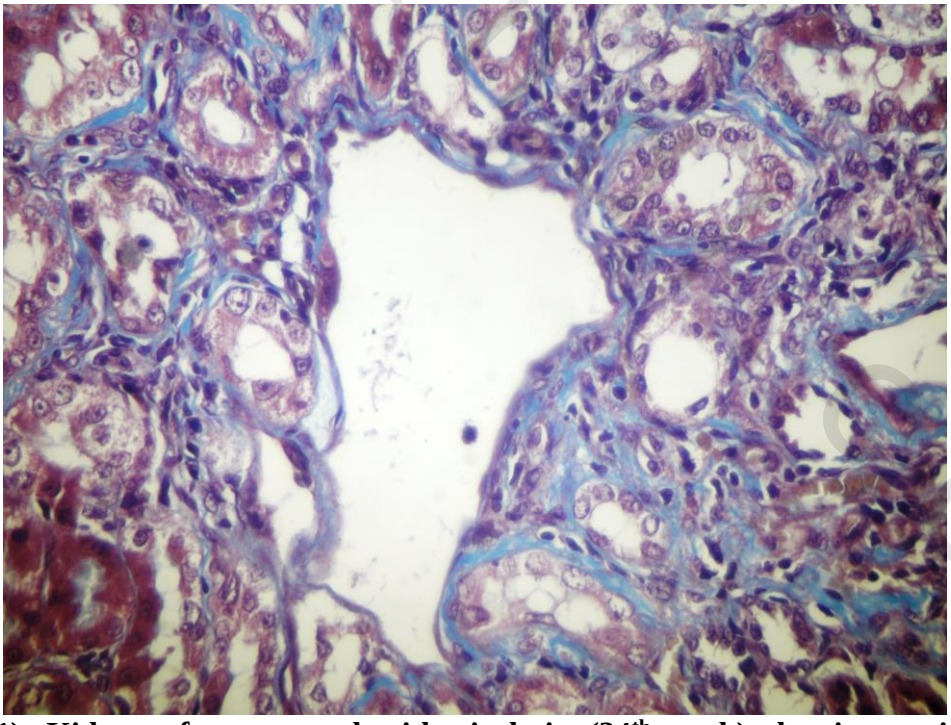

Fig. (71). Kidney of rat treated with cisplatin (34th week) showing peritubular fibrous connective tissue proliferation associated with cystic dilatation of tubules (MTC stain X 400).

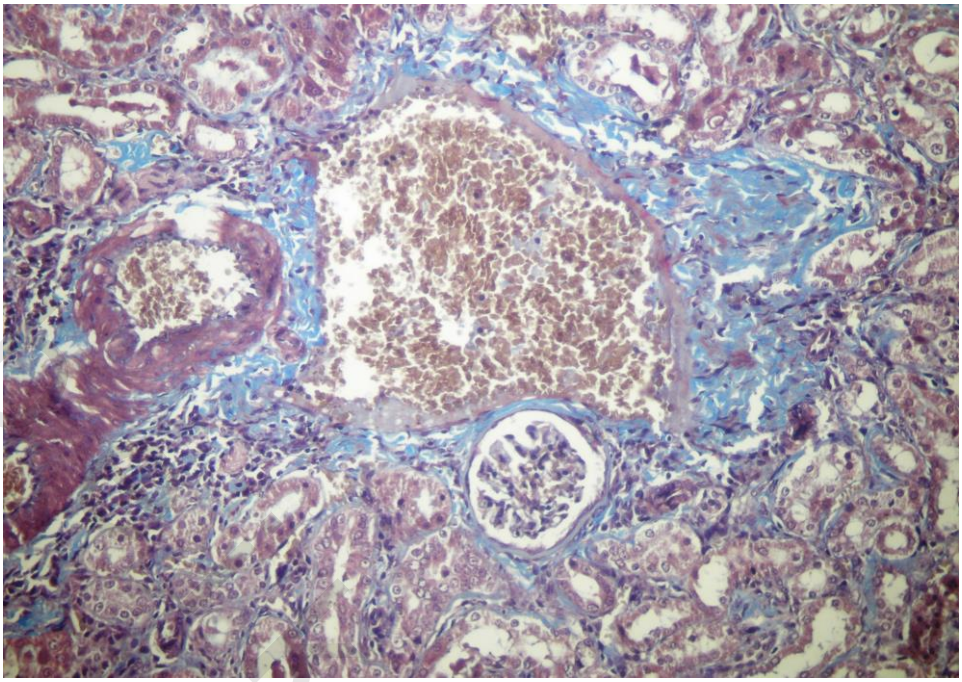

Fig. (72): Kidney of rat treated with cisplatin (34th week) showing perivascular, peritubular and periglomerular fibrous connective tissue proliferation (MTC stain X 200).

Group F

Histopathological examination of kidneys of rats treated with cisplatin and camel milk (34th week) revealed regenerated renal tubules with thickened glomerular and tubular basement membrane **(Fig. 73).** In addition congestion of intertubular blood capillaries with few interstitial inflammatory cells infiltration and cystic dilatation of renal tubules were noticed in some of the examined sections **(Fig. 74).**

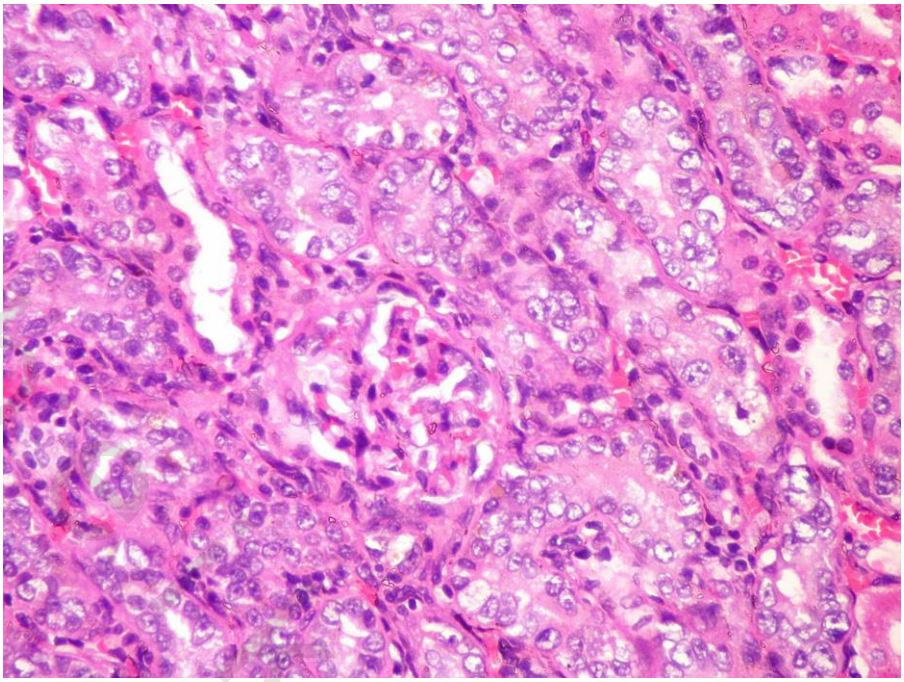

Fig. (73). Kidney of rat treated with Cisplatin and camel milk (34th week) showing regenerated renal tubules with thickened glomerular and tubular basement membrane (H and E stain X 400).

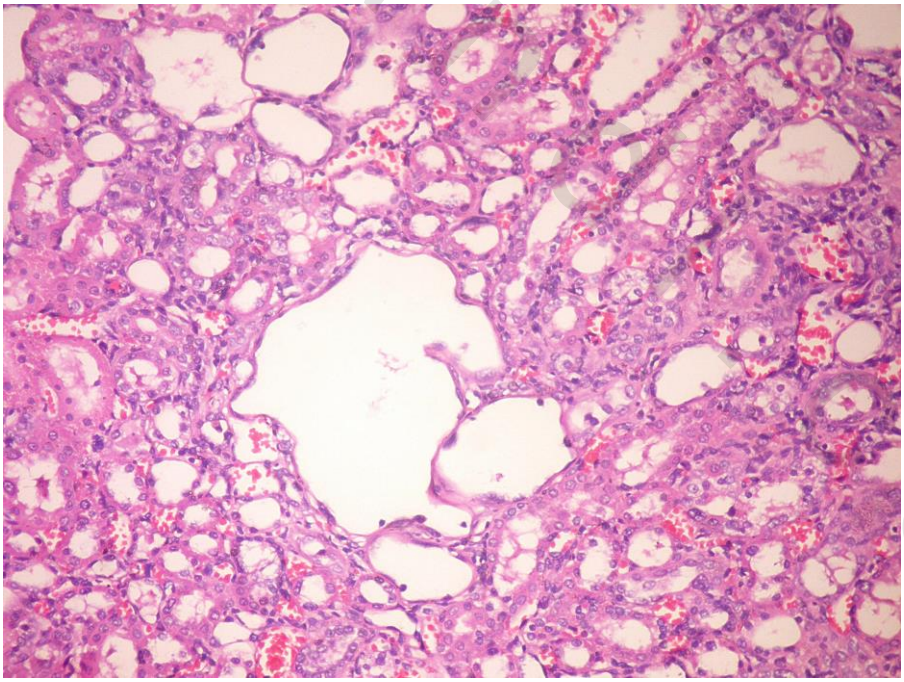

Fig. (74). Kidney of rat treated with Cisplatin and camel milk (34th week) showing congestion of intertubular blood capillaries with few interstitial inflammatory cells infiltration and cystic dilatation of renal tubules (H and E stain X 200).

Group G

Histopathological examination of kidneys of rat from group G at the 34th week post injection of DENA revealed thickened glomerular and tubular basement membrane as well as atrophy of glomerular tuft in some glomeruli **(Fig. 75, 76).**

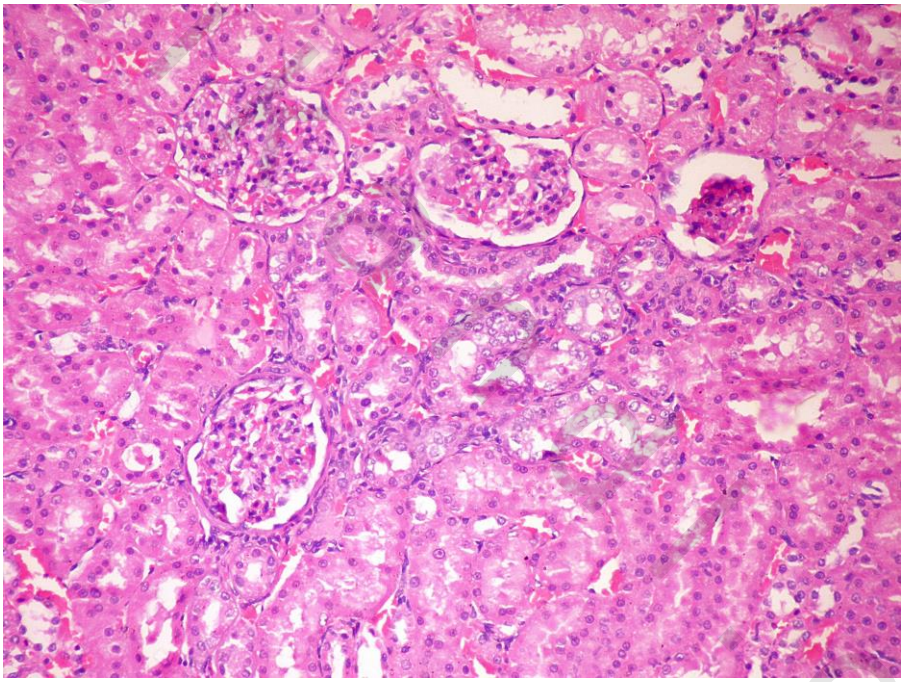

Fig. (75). Kidney of rat injected with DENA (34th week) showing thickened glomerular and tubular basement membrane (H and E stain X 200).

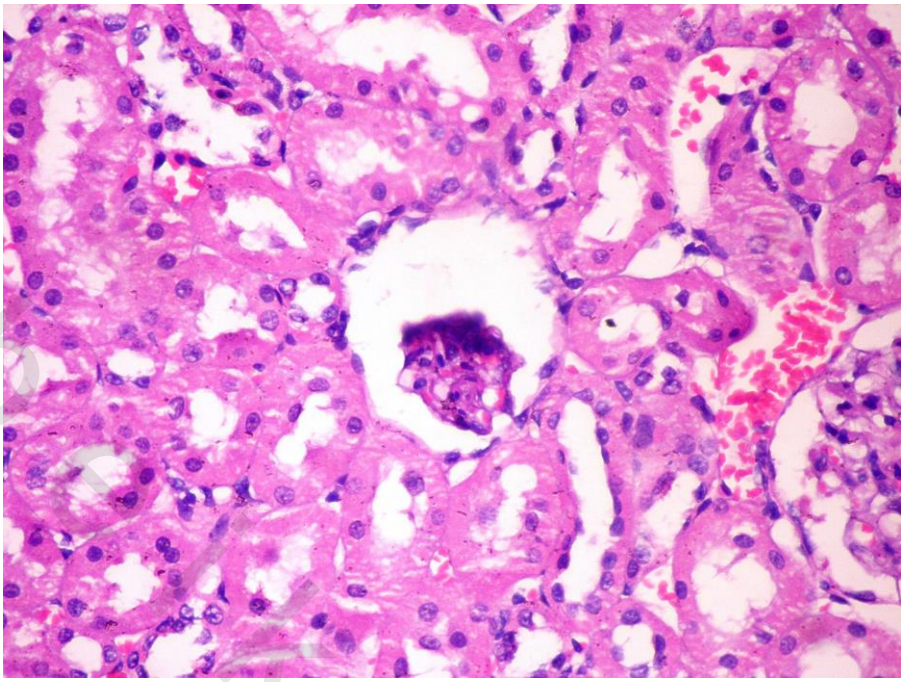

Fig. (76). Kidney of rat injected with DENA (34th week) showing atrophy of glomerular tuft (H and E stain X 400).

Group H

Kidneys of rats in group injected with DENA and treated with camel milk (34th week) showed improvement in histopathological picture as examined sections revealed congested blood vessels, slightly thickened glomerular basement membrane and few peritubular inflammatory cells infiltration **(Fig. 77).** The tubular epithelium showed minimal degenerative changes **(Fig. 78).** Some examined sections revealed no histopathological alteration**.**

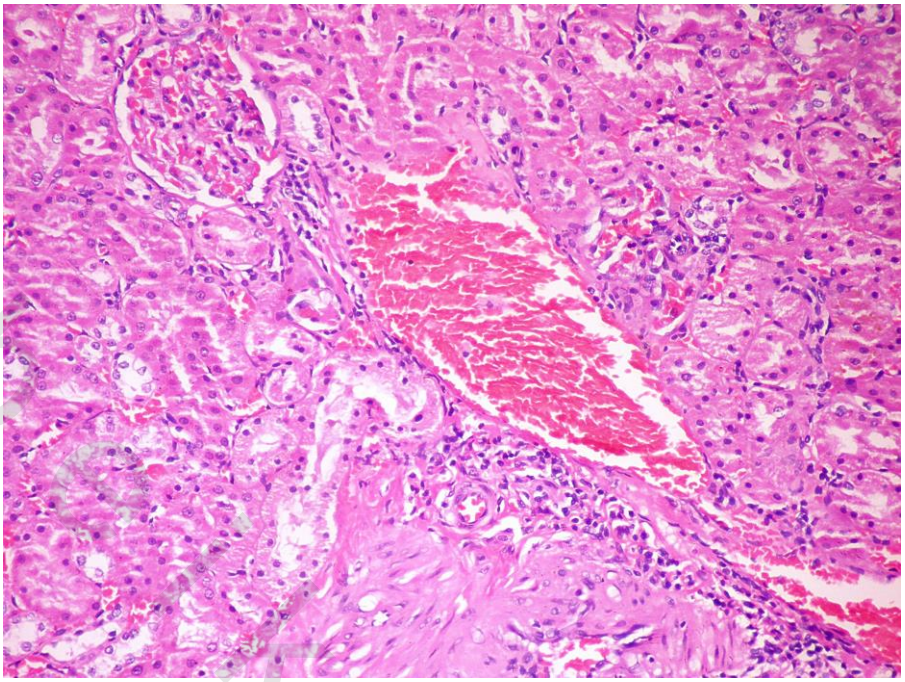

Fig. (77). Kidney of rat injected with DENA and treated with camel milk (34th week) showing congested blood vessels, and slightly thickened glomerular basement membrane and few peritubular inflammatory cells infiltration (H and E stain X 200).

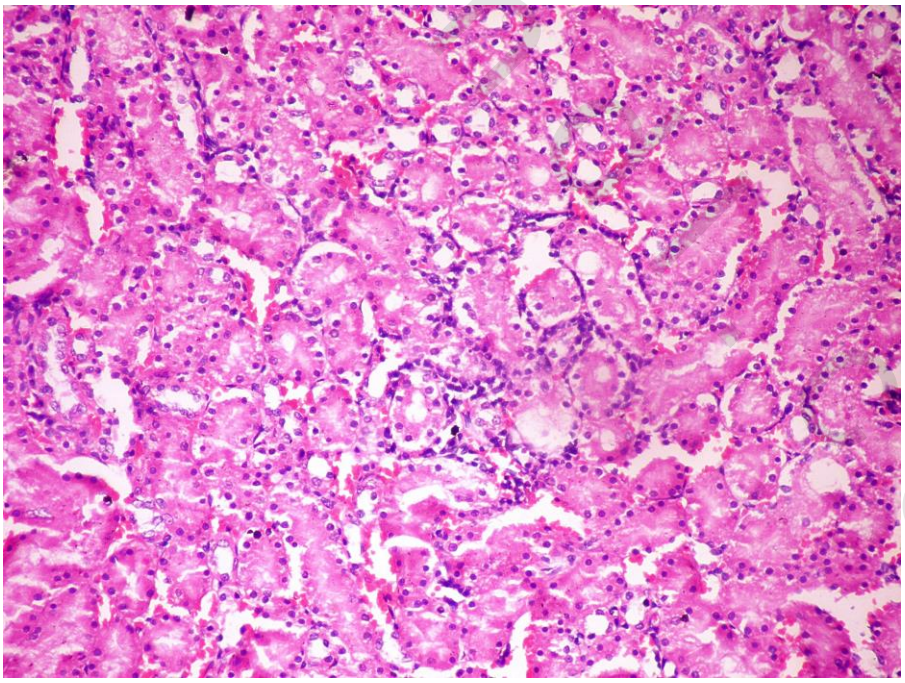

Fig. (78): Kidney of rat injected with DENA and treated with camel milk (34th week) showing few peritubular inflammatory cells infiltration with slight vacuolation of tubular epithelial lining (H and E stain X 200).

Group I

Histopathological examination of kidneys of rats injected with DENA and treated with camel milk and turmeric extract (34th week) demonstrated focus of tubular cell regeneration, congested blood vessels and few periglomerular inflammatory cells infiltration **(Fig. 79)**.

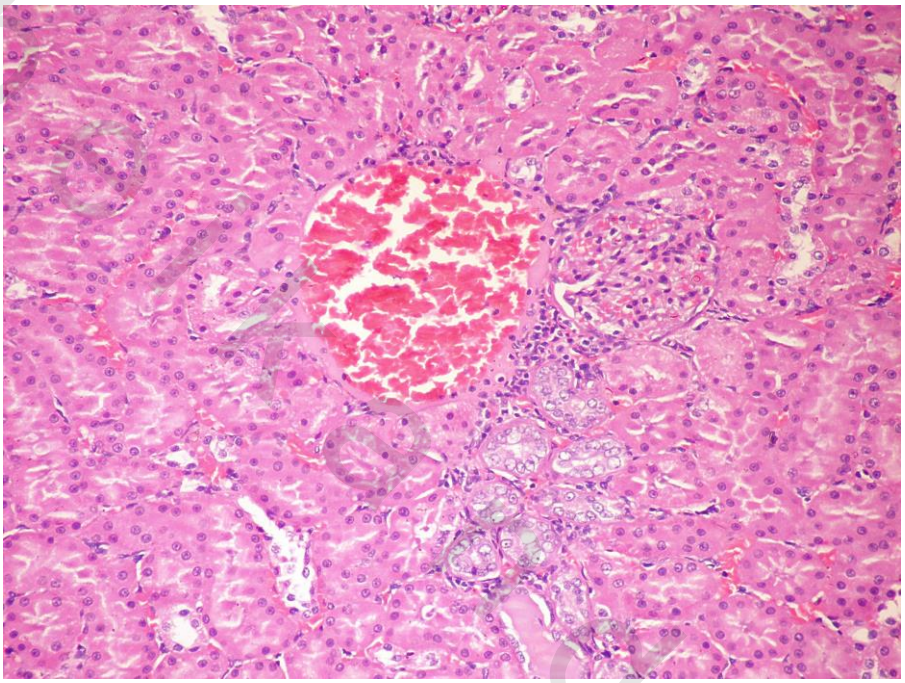

Fig. (79). Kidney of rat injected with DENA and treated with camel milk and turmeric extract (34th week) showing focus of tubular cell regeneration, congested blood vessels and few periglomerular inflammatory cells infiltration (H and E stain X 200).

Group J

Kidneys of rats injected with DENA and treated with turmeric extract (34th week) showed marked improvement as examined cases revealed no histopathological changes except for focal regenerated renal tubules **(Fig. 80).**

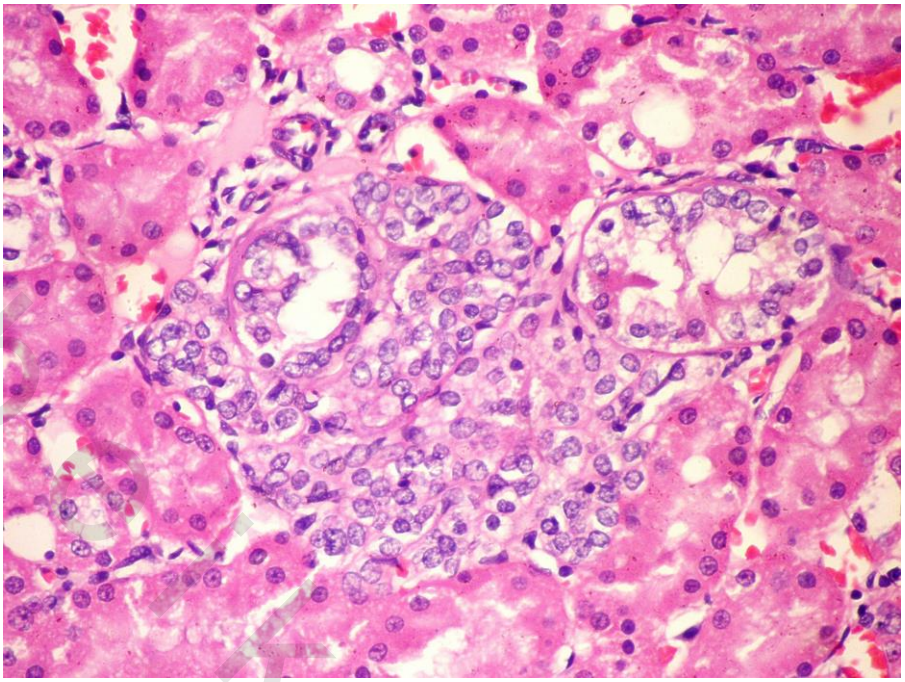

Fig. (80). Kidney of rat injected with DENA and treated with turmeric extract (34th week) showing tubular cell regeneration (H and E stain X 400).

Group K

Microscopically, kidneys of rats injected with DENA and treated with cisplatin (34th week) revealed thickening of glomerular and tubular basement membrane as confirmed by red coloration with PAS stain **(Fig. 81).** Congestion of intertubular blood capillaries, cytoplasmic vacuolation of renal tubular epithelium, intraluminal protein casts **(Fig. 82)**, acute tubular necrosis and focal inflammatory cell infiltration were demonstrated **(Fig. 83).** Karyomegaly of tubular epithelium **(Fig. 84)** and cystic tubular dilatation were also observed in some examined sections.

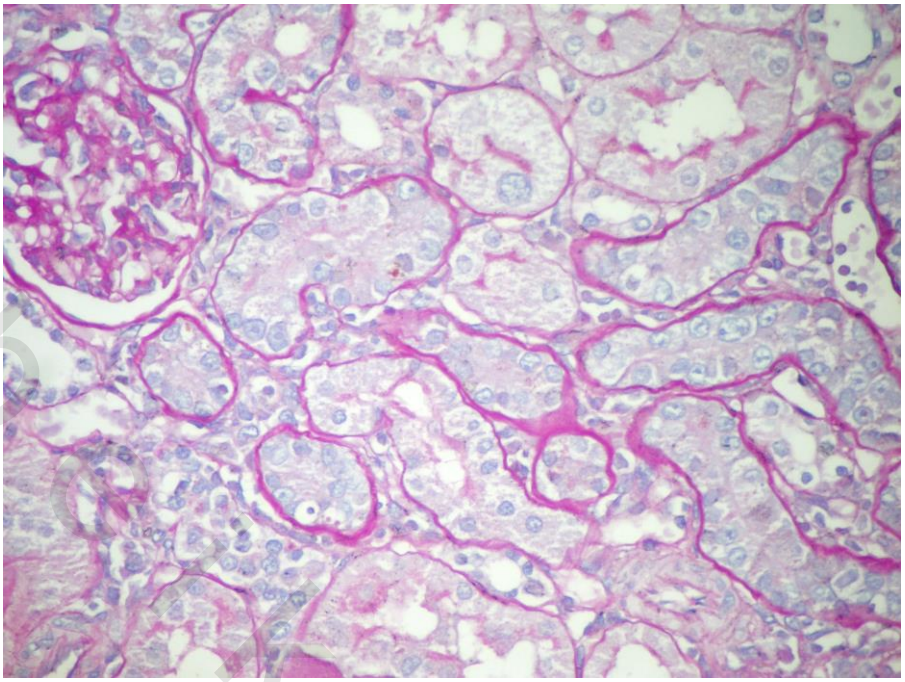

Fig. (81). Kidney of rat injected with DENA and treated with cisplatin (34th week) showing thickened tubular and glomerular basement membrane (PAS stain X400).

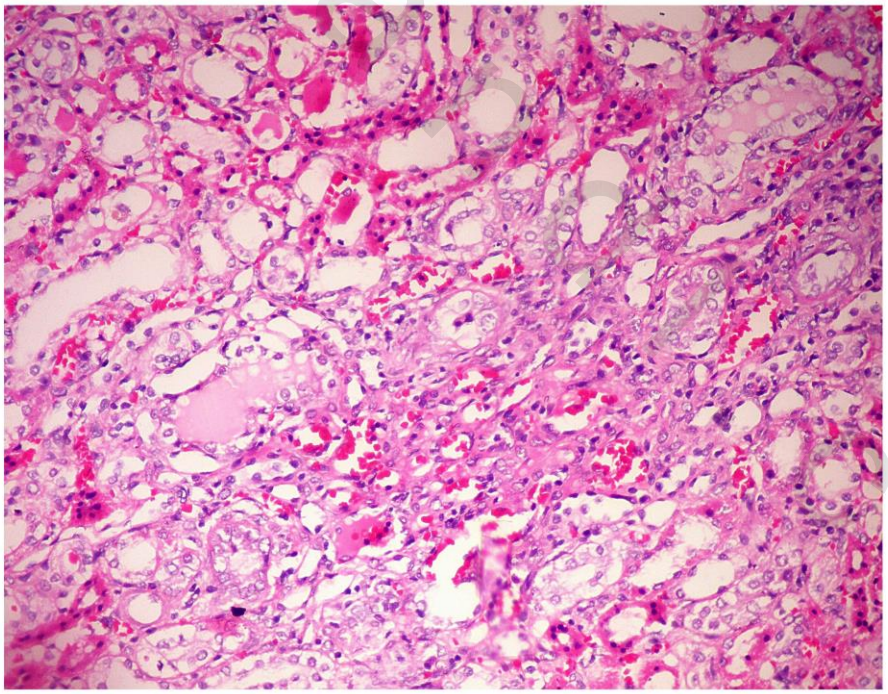

Fig. (82): Kidney of rat injected with DENA and treated with cisplatin (34th week) showing cytoplasmic vacuolation of renal tubular epithelium and intraluminal protein casts. Notice the congestion of intertubular blood capillaries (H and E stain X 200).

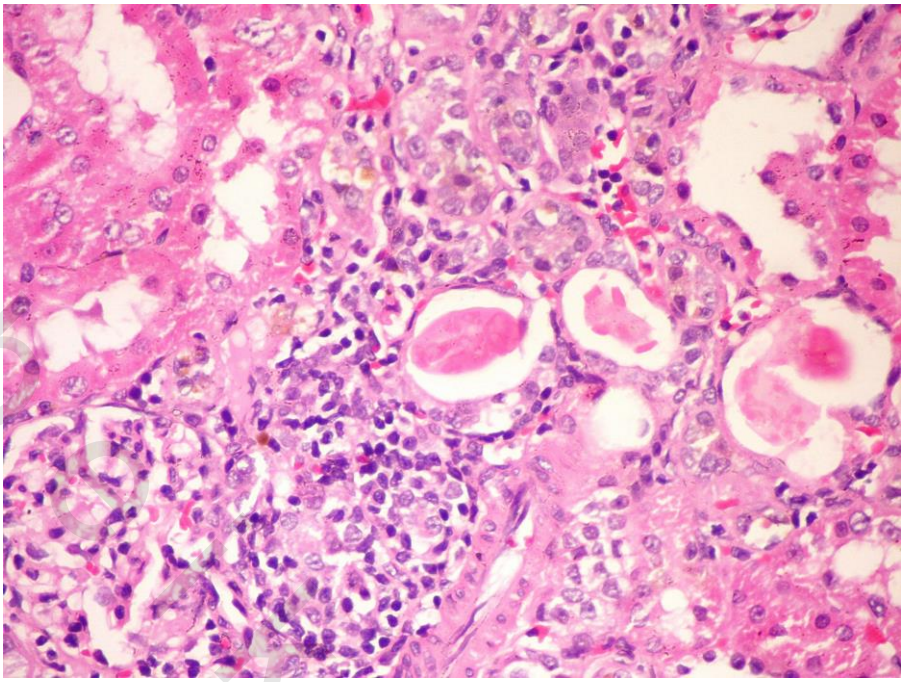

Fig. (83): Kidney of rat injected with DENA and treated with cisplatin (34th week) showing focus of acute tubular necrosis, inflammatory cell infiltration and intraluminal protein casts (H and E stain X 400).

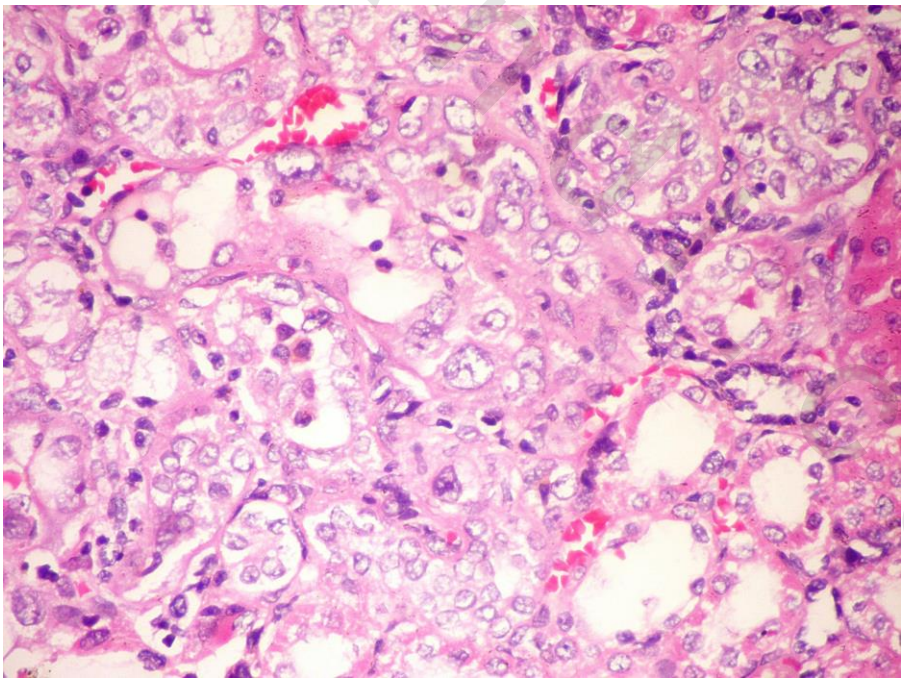

Fig. (84): Kidney of rat injected with DENA and treated with cisplatin (34th week) showing karyomegaly of tubular epithelium (H and E stain X 400).

Group L

Histopathology of kidneys of rats injected with DENA and treated with cisplatin and camel milk (34th week) exhibited congestion of glomerular tuft with hypercellularity and thickened tubular basement membrane **(Fig. 85).** There was also cytoplasmic vacuolation of epithelial lining of some renal tubules and necrosis in renal tubular epithelium in outer zone of medulla **(Fig. 86)**.

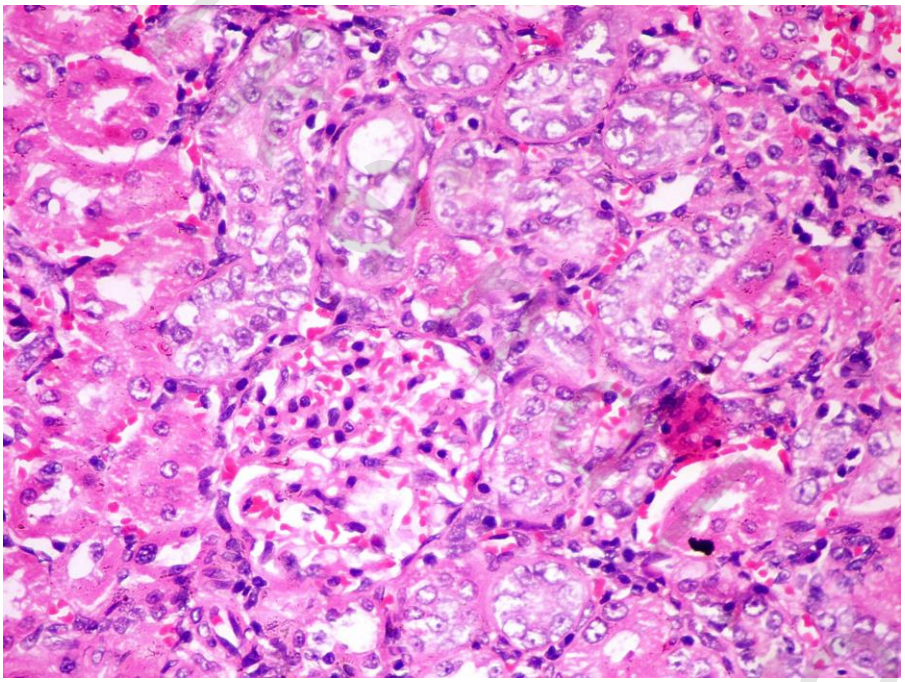

Fig. (85): Kidney of rat injected with DENA and treated with cisplatin and camel milk (34th week) showing congestion of glomerular tuft with hypercellularity and slightly thickened tubular basement membrane (H and E stain X 400).

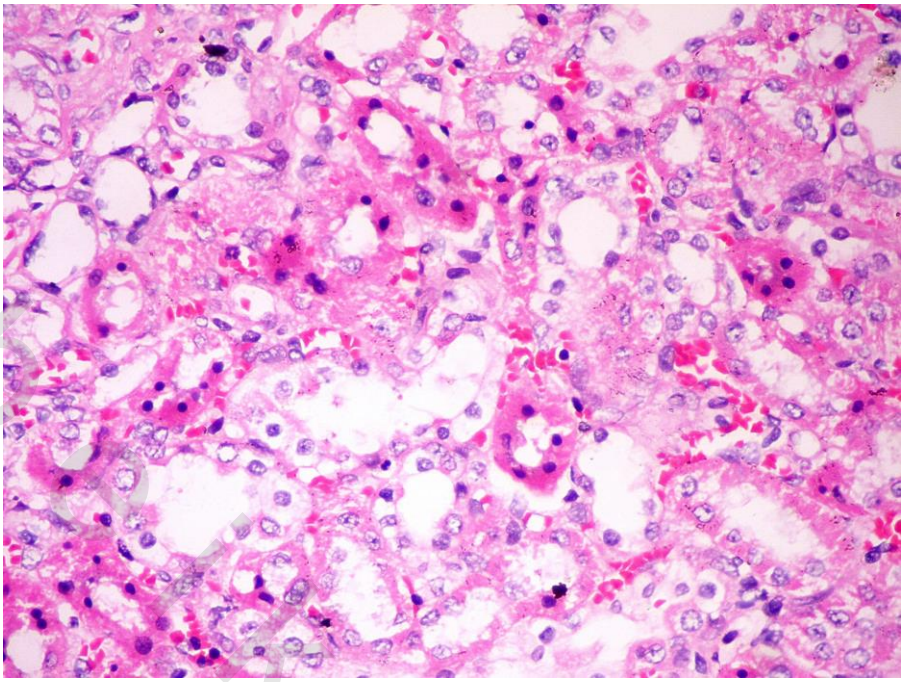

Fig. (86): Kidney of rat injected with DENA and treated with cisplatin and camel milk (34th week) showing vacuolation of epithelial lining of some renal tubules and necrosis in renal tubular epithelium in the outer zone of medulla (H and E stain X 400).

B. At 38th week

Groups A, B, C and D at 38th week revealed no histopathological alterations.

Group E

Histopathological examination of kidneys of rat treated with cisplatin (38th week) revealed severe and extensive which were manifested by thickening of glomerular and tubular basement membrane, atrophy of glomerular tuft and interstitial nephritis **(Fig. 87). T**here was severe chronic interstitial nephritis with marked fibrosis and heavy mononuclear inflammatory cells infiltration **(Fig. 88).** Multifocal areas of cystic dilatation of renal tubules were distinct **(Fig. 89)**.

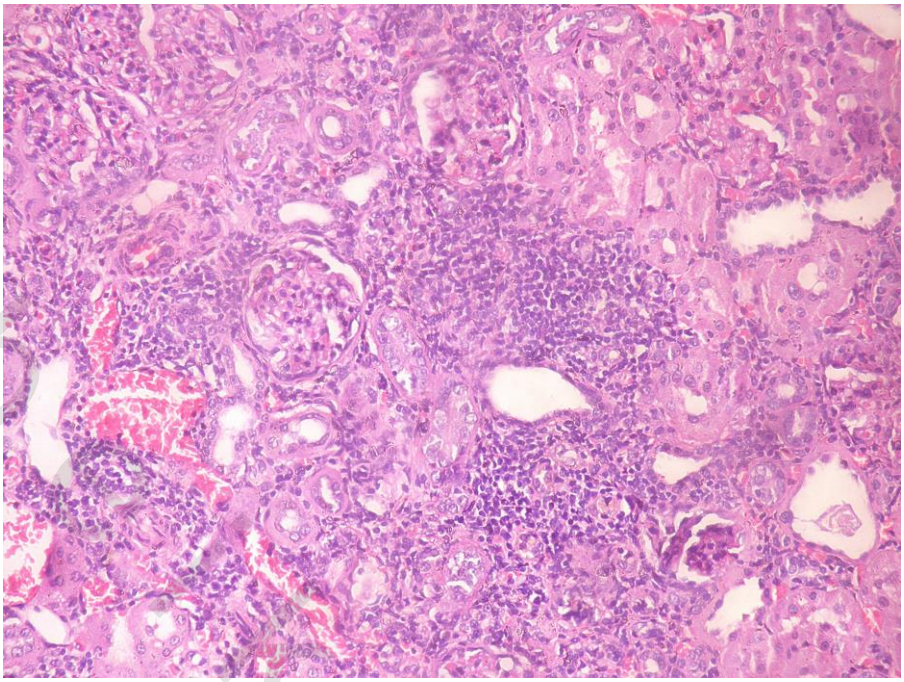

Fig. (87): Kidney of rat treated with cisplatin (38th week) showing thickening of glomerular and tubular basement membrane, atrophy of glomerular tuft and interstitial nephritis (H and E stain X 200).

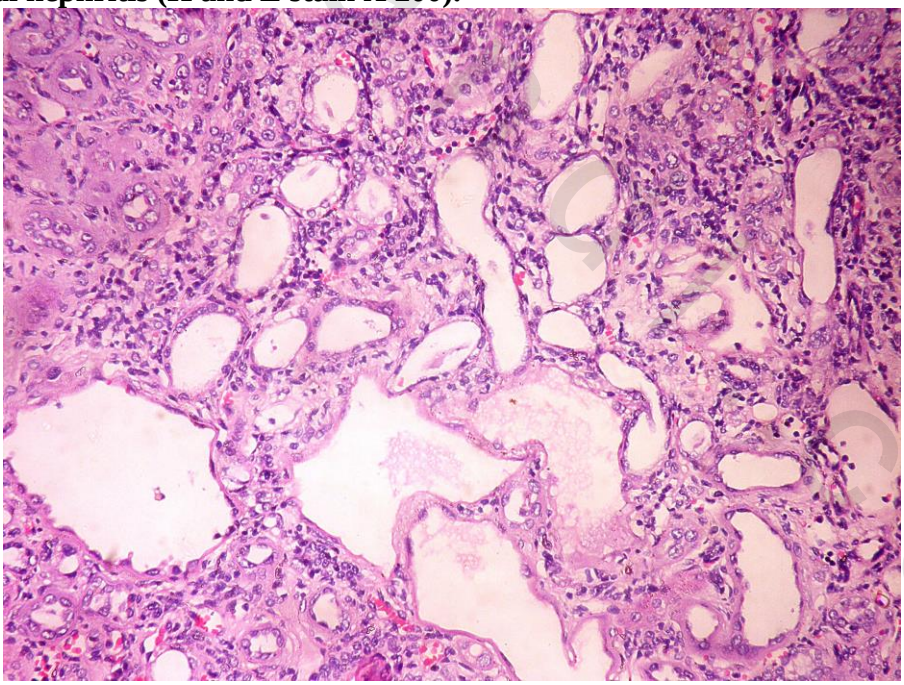

Fig. (88): Kidney of rat treated with cisplatin (38th week) showing chronic interstitial nephritis. Notice the cystic dilatation of renal tubules and interstitial fibroblastic proliferation (H and E stain X 200).

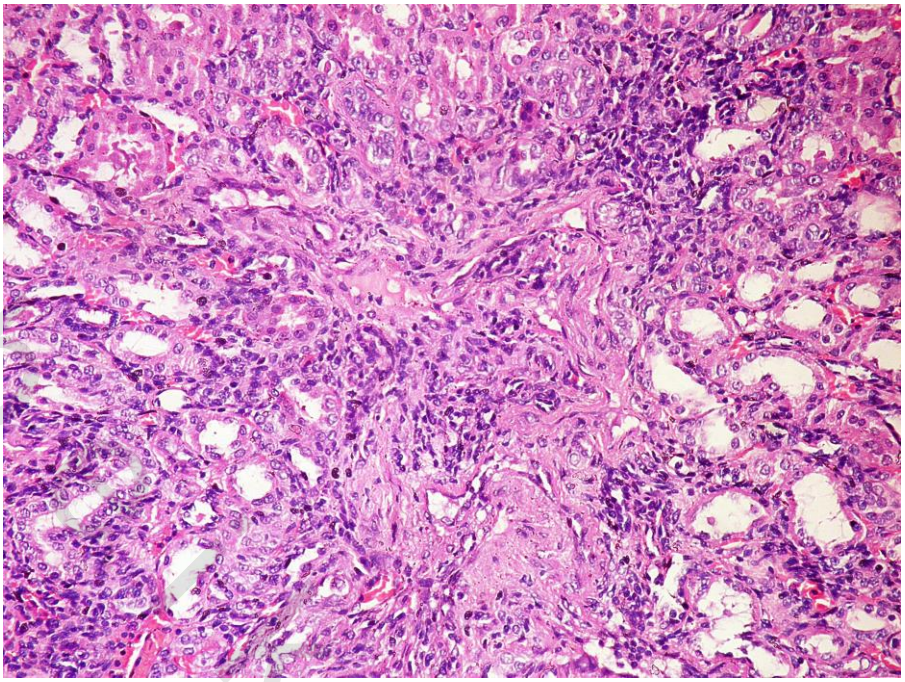

Fig. (89): Kidney of rat treated with cisplatin (38th week) showing chronic interstitial nephritis. Notice marked fibrosis associated with mononuclear inflammatory cell infiltration (H and E stain X 200).

Group F

At 38th week, kidneys of rats treated with cisplatin and camel milk showed less severe picture of chronic interstitial nephritis and continuous presence of thickened glomerular and tubular basement membrane **(Fig. 90).** Necrobiotic changes of tubular renal epithelium were evident with foci of tubular cell regeneration and inflammatory cells infiltration **(Fig. 91).**

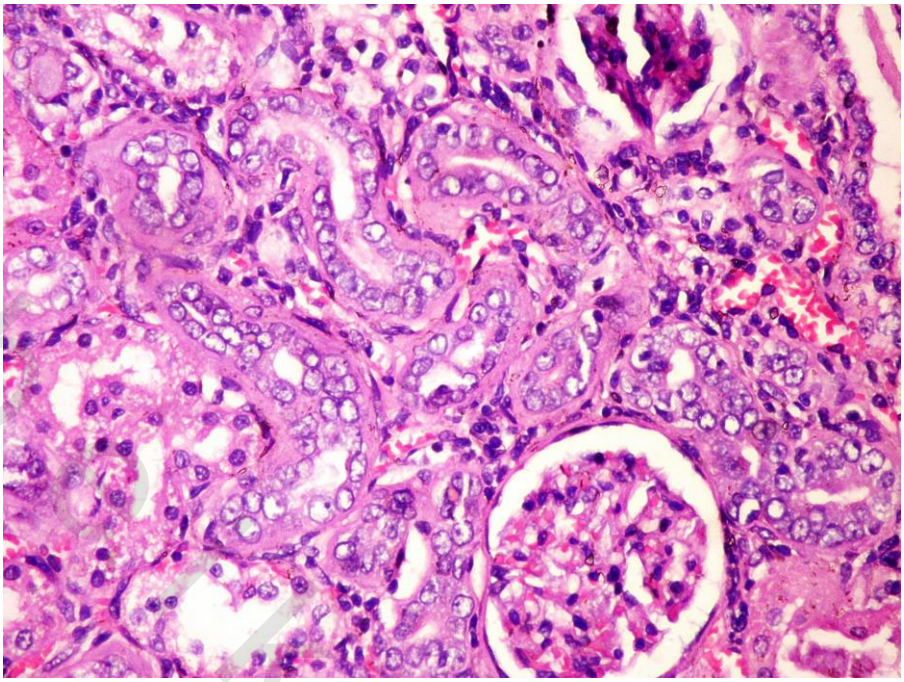

Fig. (90): Kidney of rat treated with Cisplatin and camel milk (38th week) showing thickening of glomerular and tubular basement membrane as well as foci of tubular cell regeneration (H and E stain X 400).

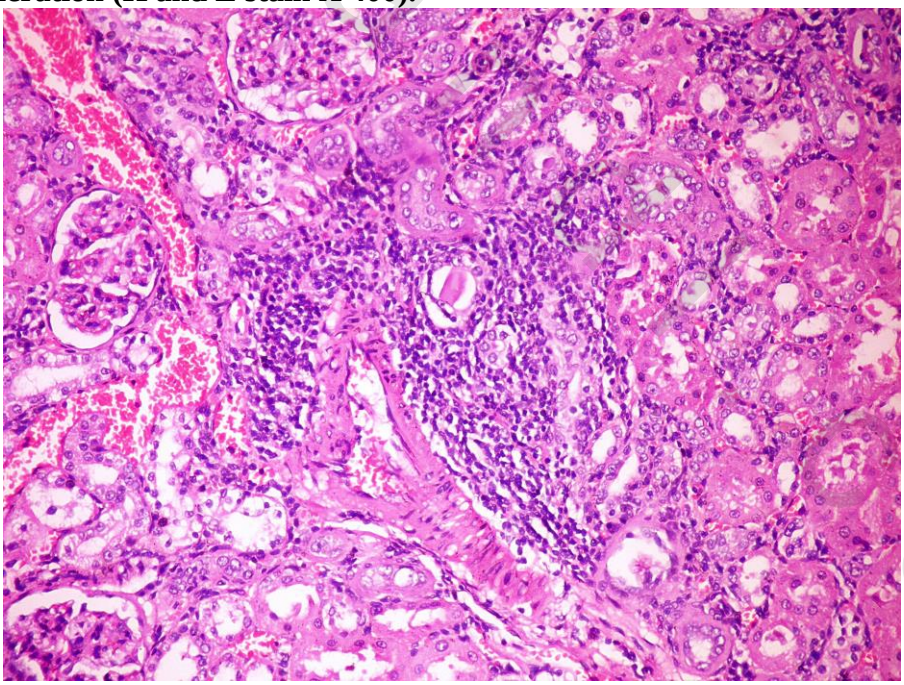

Fig. (91): Kidney of rat treated with Cisplatin and camel milk (38th week) showing necrosis of renal tubules which replaced by inflammatory cell infiltration (H and E stain X 200).

Group G

Kidneys of rats injected with DENA (38th week) showed tubular cell adenoma in the renal cortex of only one rat. It appeared as well circumscribed discrete mass of basophilic epithelial cells exhibiting solid pattern. Compression of the adjacent normal parenchyma was very clear with presence of mitotic figure **(Fig 92, 93).** Moreover, atrophy of glomerular tuft and focal areas of inflammatory cell infiltration was evident.

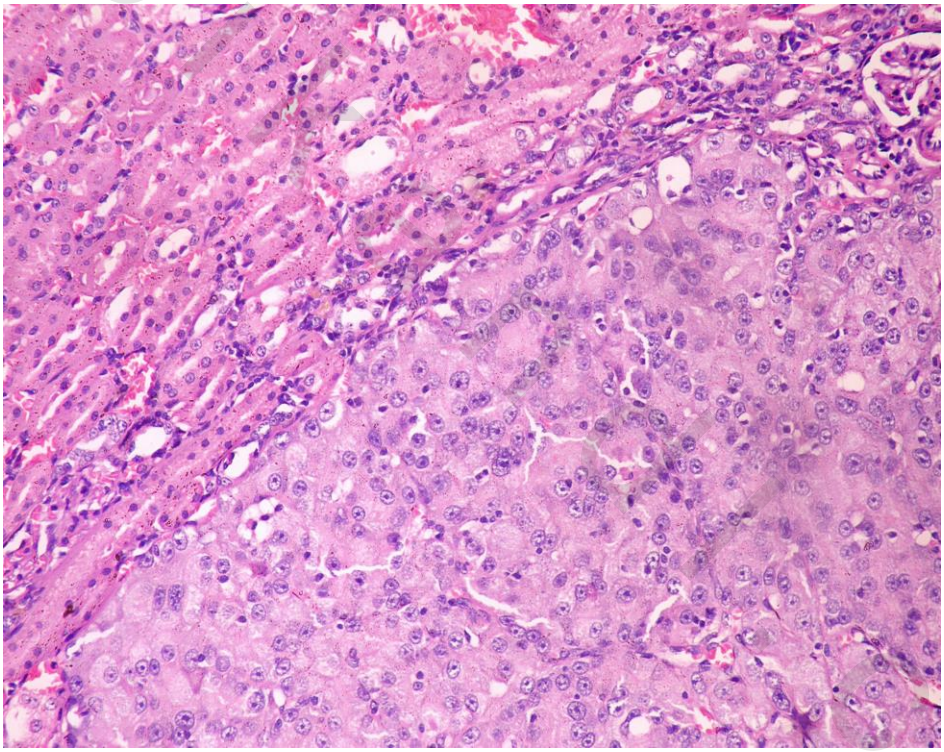

Fig. (92): Kidney of rat injected with DENA (38th week) showing tubular cell adenoma of solid pattern with compression of adjacent parenchyma (H and E stain X 200)

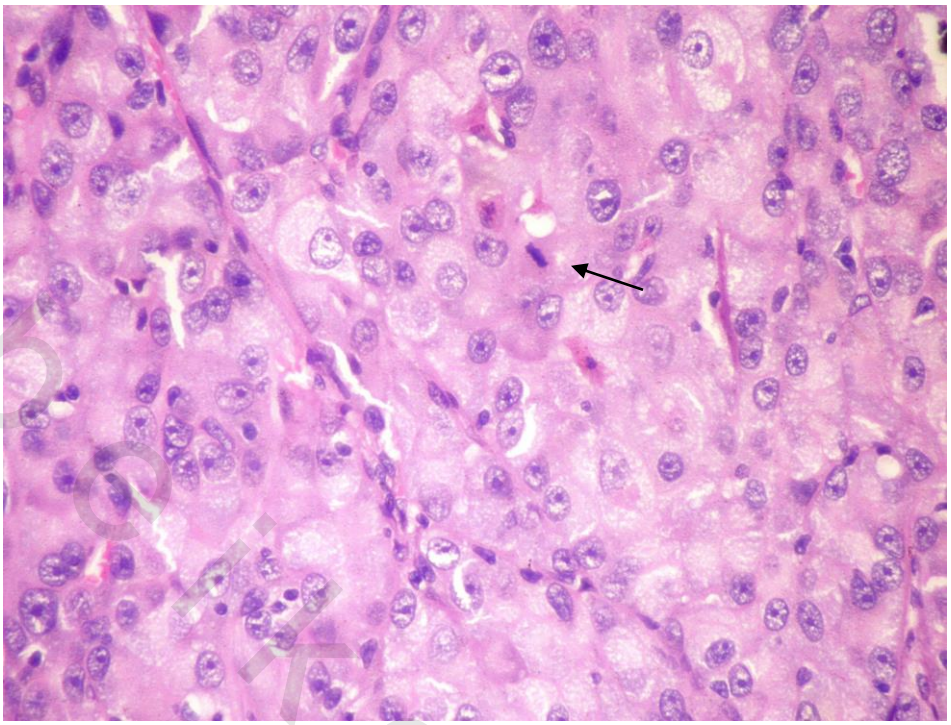

Fig. (93): Kidney of rat injected with DENA (38th week) showing tubular cell adenoma. Notice mitotic figure (arrow) (H and E stain X 400).

Group H

Histopathology of kidneys of rats injected with DENA and treated with camel milk (38th week) revealed foci of necrobiotic changes of tubular epithelium besides regenerative foci and slightly thickened glomerular and tubular basement membrane. Congested blood vessels and focal inflammatory cell infiltration were also noticed in some examined sections **(Fig. 94).**

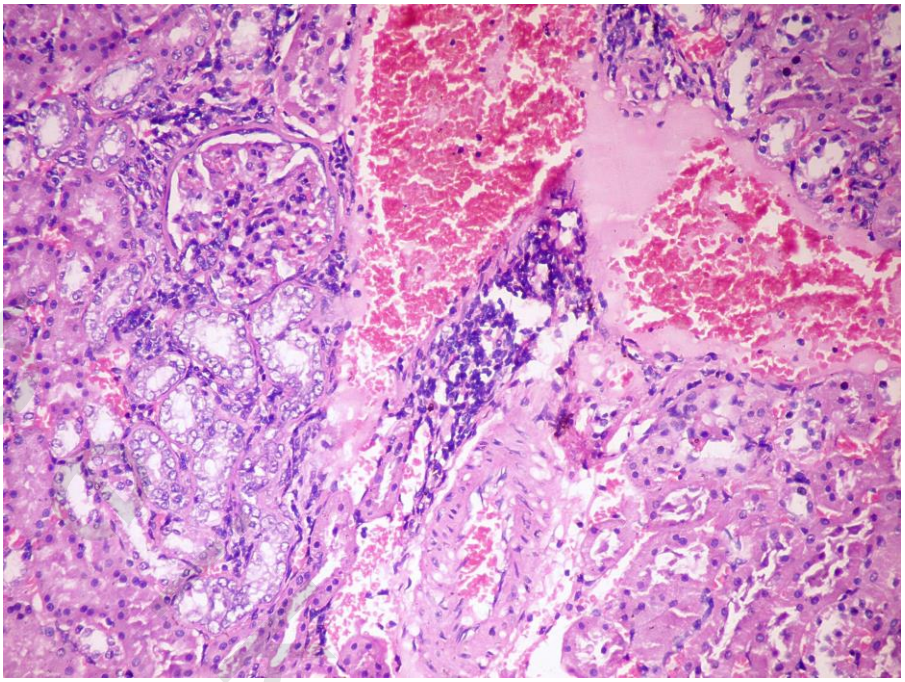

Fig. (94): Kidney of rat injected with DENA and treated with camel milk (38th week) showing regenerative foci, thickened glomerular and tubular basement membrane. Notice congested blood vessels and focal inflammatory cells infiltration (H and E stain X 200).

Group I

Microscopically, kidneys of rats injected with DENA and treated with camel milk and turmeric extract (38th week) showed the same lesions as group H which demonstrated regenerated renal tubules, thickened glomerular and tubular basement membranes and few inflammatory cell infiltration **(Fig 95).** No evidence of tumor formation in all examined cases.

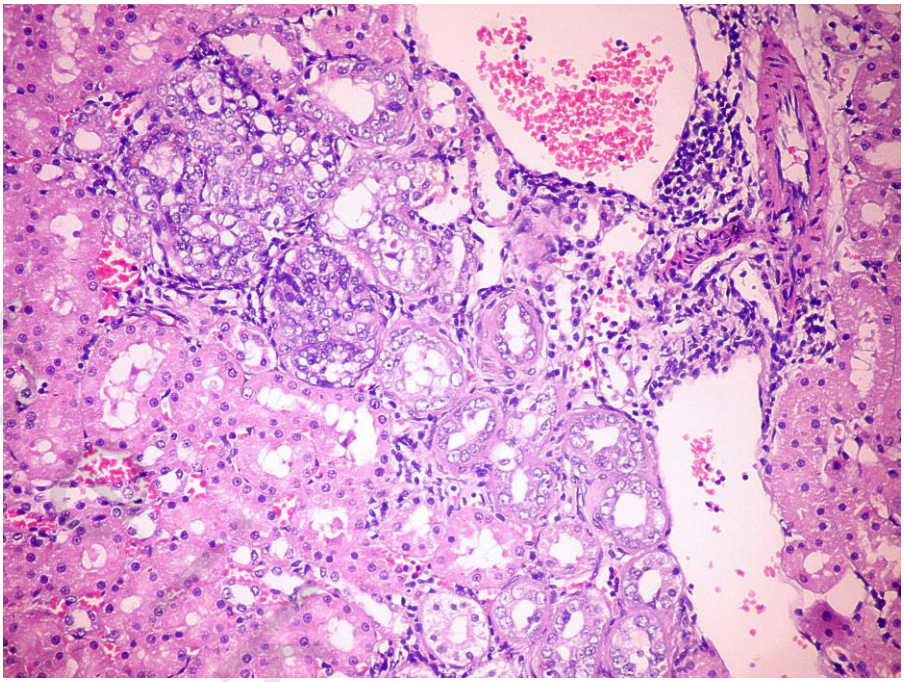

Fig. (95): Kidney of rat injected with DENA and treated with camel milk and turmeric extract (38th week) showing regenerated renal tubules, thickened tubular basement memebranes and few inflammatory cells infiltration (H and E stain X 200).

Group J

Kidneys of rats injected with DENA and treated turmeric extract (38th week) revealed no histopathological alteration except for thickening of tubular basement membrane and few peritubular inflammatory cells infiltration **(Fig. 96).**

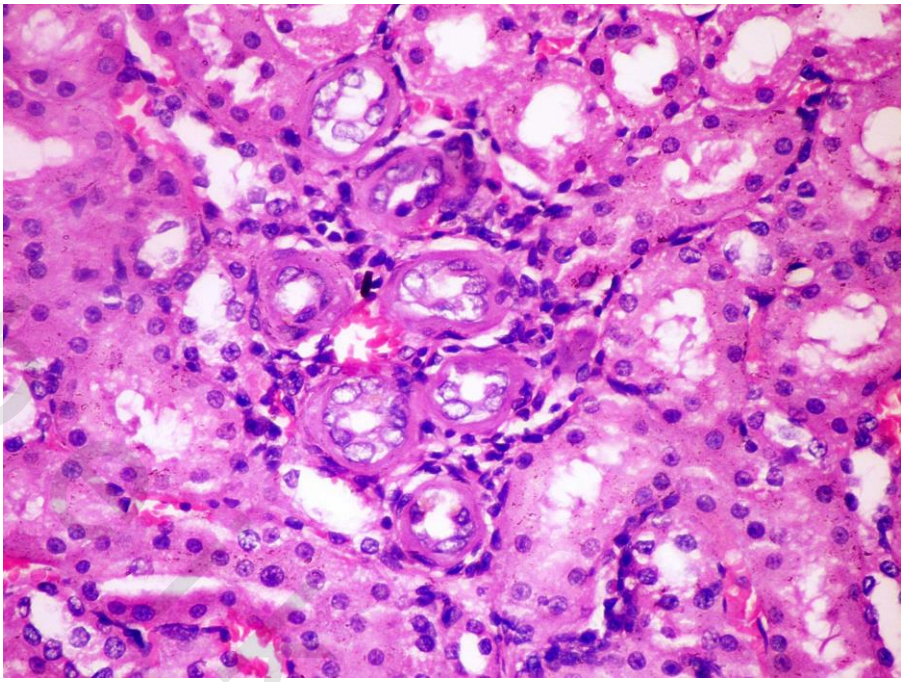

Fig. (96): Kidney of rat injected DENA and treated with turmeric extract (38th week) showing thickening of tubular basement membrane and few peritubular inflammatory cells infiltration (H and E stain X 400).

Group K

Kidneys of rats injected with DENA and treated with cisplatin (38th week) showed severe histopathological alterations manifested by thickening of glomerular and tubular basement membrane **(Fig. 97),** focal tubular necrosis replaced by inflammatory cell infiltration **(Fig. 98).** Chronic interstitial nephritis with cystic dilatation of renal tubules and interstitial fibroblastic proliferation were demonstrated in some sections **(Fig. 99).**

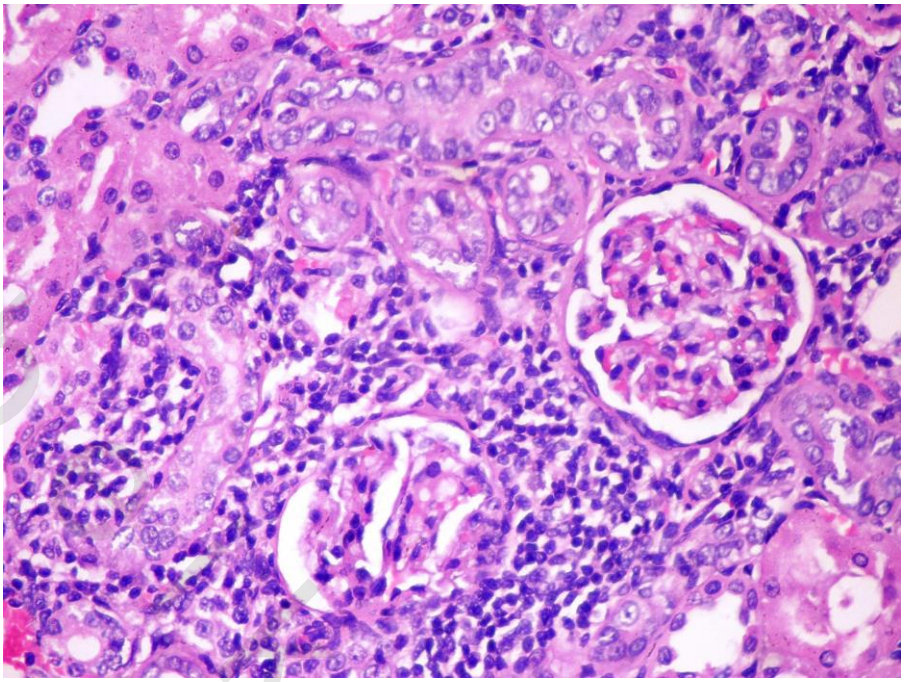

Fig. (97): Kidney of rat injected with DENA and treated with cisplatin (38th week) showing thickening of glomerular and tubular basement membrane and focal interstitial nephritis. (H and E stain X 400).

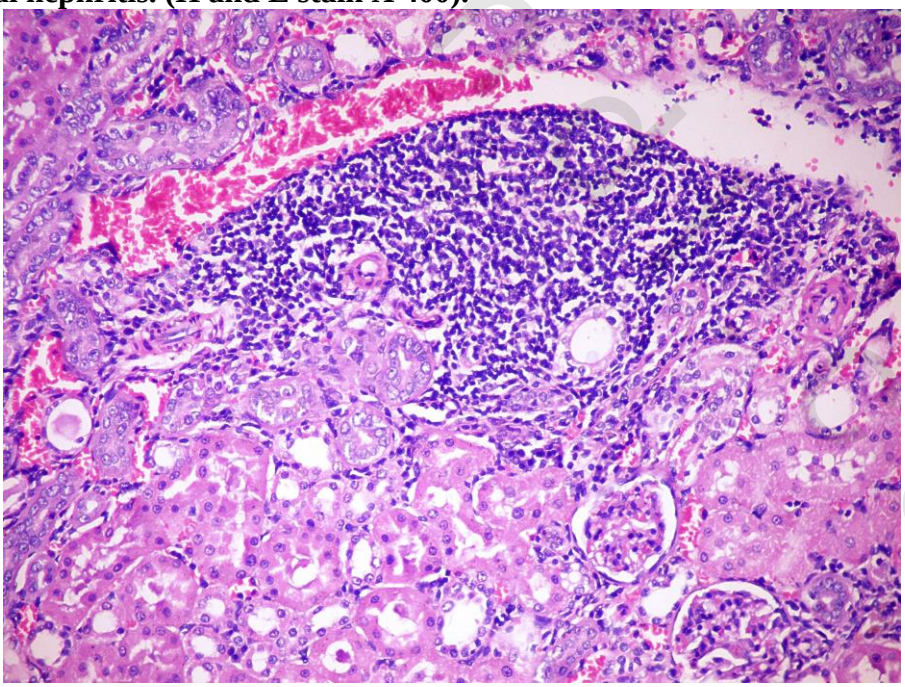

Fig. (98): Kidney of rat injected with DENA and treated with cisplatin (38th week) showing focal tubular necrosis replaced by lymphocytic inflammatory cell infiltration (H and E stain X 200).

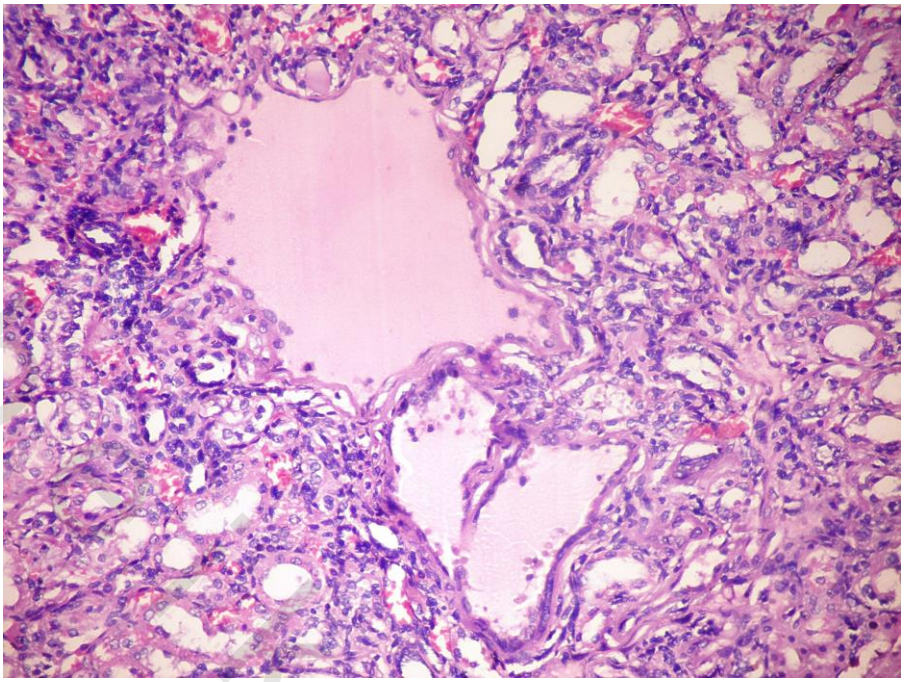

Fig. (99): Kidney of rat injected with DENA and treated with cisplatin (38th week) showing chronic interstitial nephritis. Notice cystic dilatation of renal tubules and interstitial fibroblastic proliferation (H and E stain X 200).

Group L

Kidneys of rats injected with DENA and treated with cisplatin and camel milk (38th week) exhibited less intense lesion to some extent than group K. Thickening of glomerular basement membrane and tubular basement membrane associated with few mononuclear inflammatory cell infiltrates were evident **(Fig. 100).** Moderate chronic interstitial nephritis associated with different necrobiotic changes of renal tubules besides foci of regenerated tubules were demonstrated. proteinaceous casts in the lumen of renal tubules were noticed.

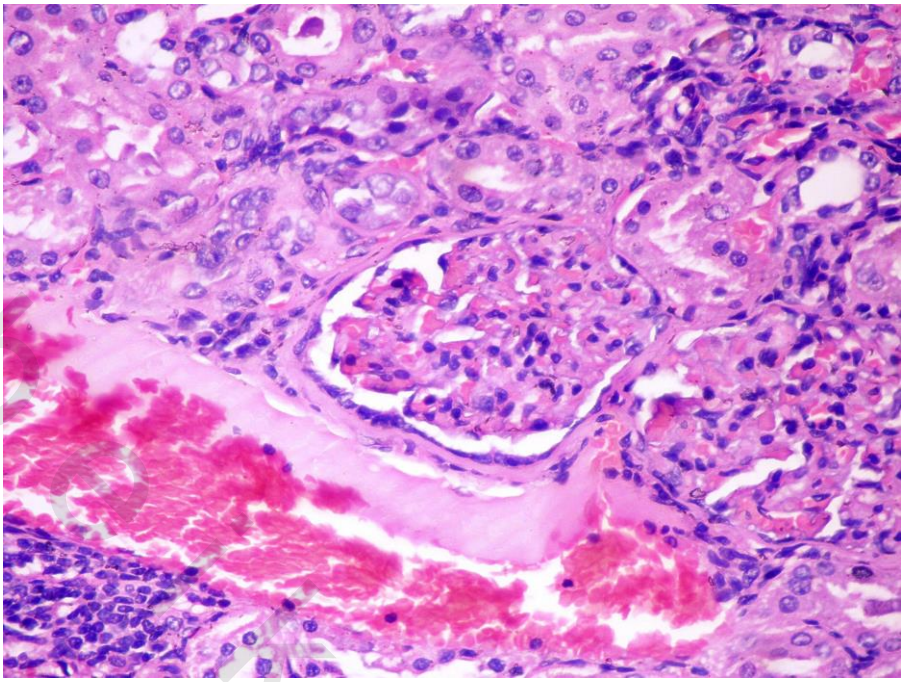

Fig. (100): Kidney of rat injected with DENA and treated with cisplatin and camel milk (38th week) showing increase cellularity of capillary tuft and thickening of Bowman's capsule (H and E stain X 400).